

In this Issue—*Dealers Convention at Cleveland*

# MOTOR AGE

Volume XXXVI  
Number 24

PUBLISHED WEEKLY AT THE MAILERS BUILDING  
CHICAGO. DECEMBER 11, 1919

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Three Dollars a Year



## Dependable Priming Plugs

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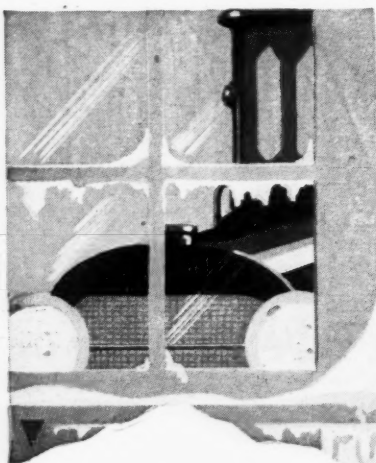
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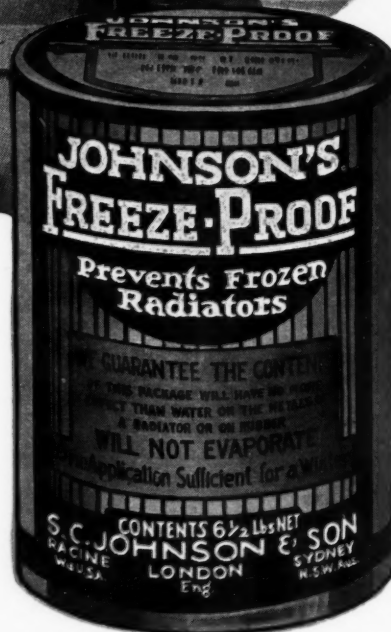
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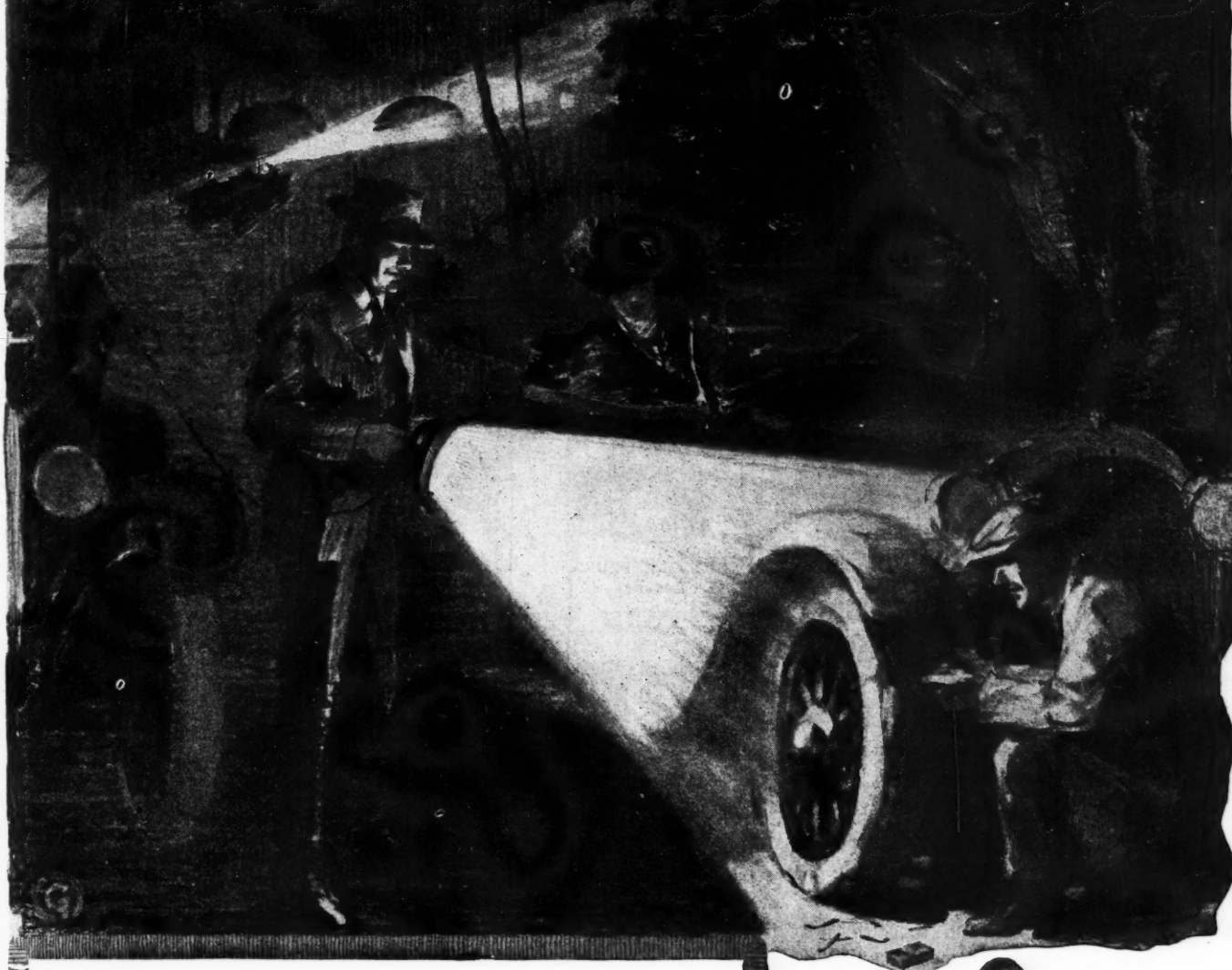
One package will protect a Ford to 5° below zero, one and a half packages will protect a Ford to 30° below zero and two packages to 50° below zero. For larger cars or to protect to a lower temperature, use additional Freeze-Proof according to the scale on the package. Cost \$1.50 per package in the U. S. A. East of Rockies.

FOR SALE BY ALL DEALERS

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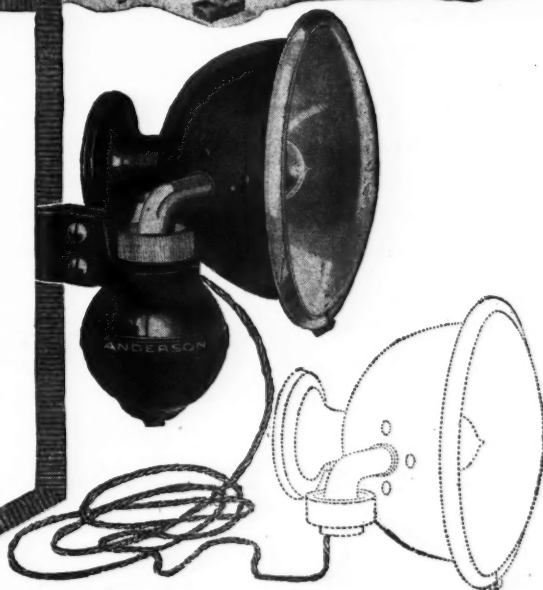
Autoreelite makes repairing on the road as easy by night as by day. This powerful light can be "spotted" on any part of the road or detached and reeled out to a distance of 12 feet. Two twists of the thumb and finger releases it. Attached to the windshield—fits any car.

Yet Autoreelite costs no more than ordinary spotlights—seven-inch size, \$10. Six-inch size, \$9.00. Other models. Write for full information in Booklet MA301.

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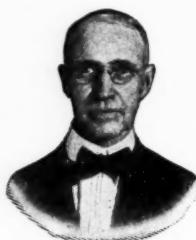
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His broad vision opens this great opportunity to the men of America.



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## Ambu Engineering Institute

C. J. BUCKWALTER, President

**Administrative Offices:**  
1605 South Michigan Avenue

**Institute Building:**  
2632 Prairie Avenue

**CHICAGO**

"You are taught to Think Electrically at Ambu"

# MOTOR AGE

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Manufacturers of ignition apparatus and lighting generators using "NORMA" Ball Bearings fear no bearing troubles or failures. And builders of cars, trucks, tractors, power boats and airplanes carrying this high-grade apparatus fear no criticism due to trouble with their electrical equipment.

**Be SURE. See that your  
Electrical Apparatus is  
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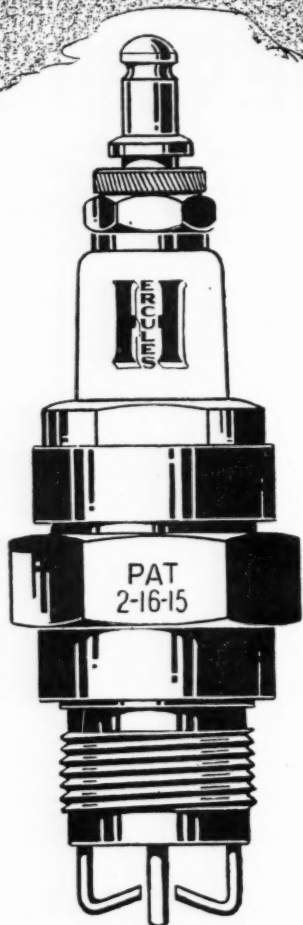
## THE NORMA COMPANY OF AMERICA

1790 BROADWAY

NEW YORK

Ball, Roller, Thrust and Combination Bearings

# HERCULES SPARK PLUGS



## Dependability

Conditions encountered in high compression motors, necessitate the use of spark plugs above the average in construction.

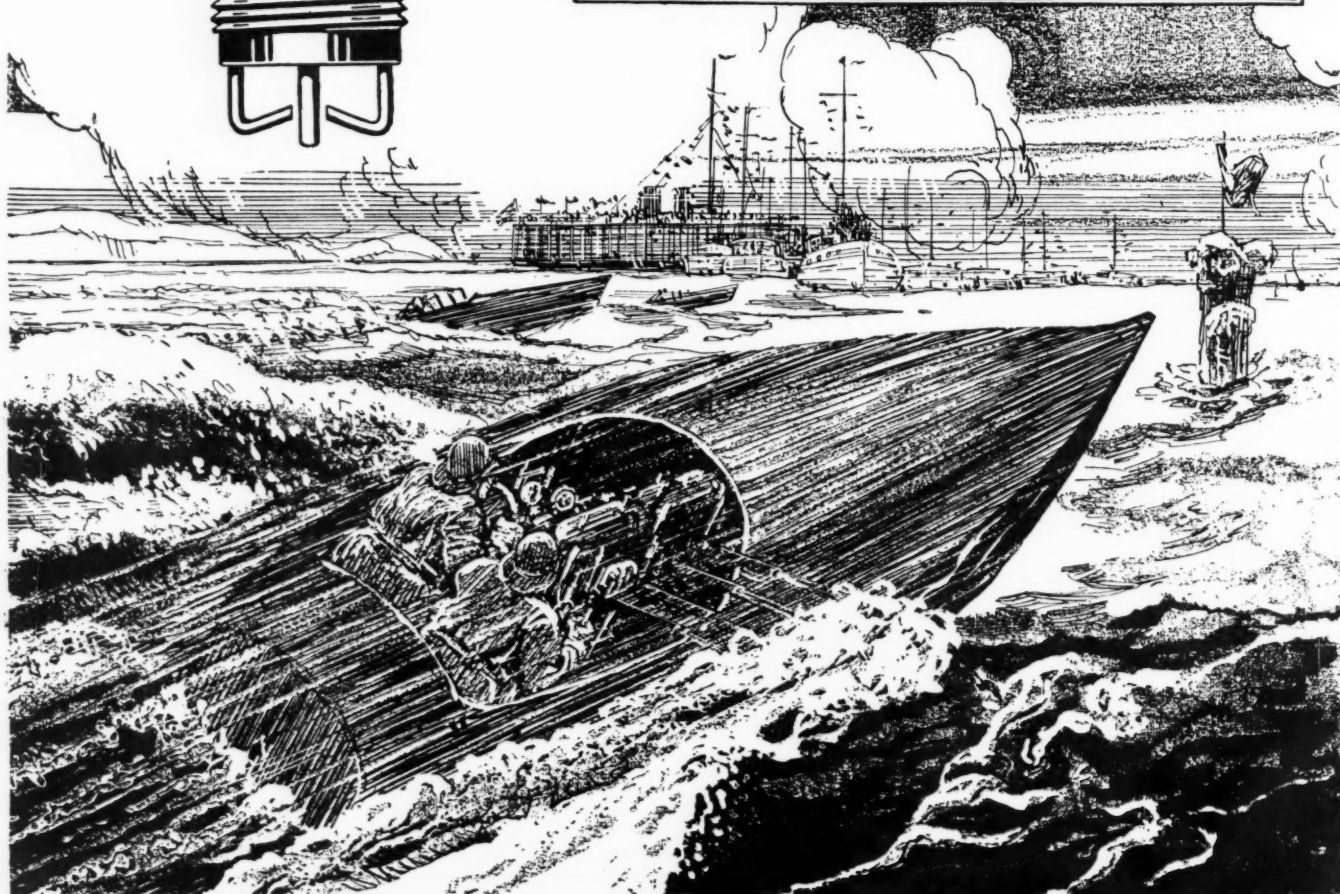
## HERCULES Spark Plugs

are recommended to those passenger car, truck and tractor owners who have had spark plug difficulties. A dependable product with exclusive construction features, such as the spring gland which eliminates porcelain breakage and prevents compression leakage.

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Indianapolis,

U. S. A.





# The Publisher's Service Station

*Rendering Service to Help You Render Service*



## THANK YOU!

*A word of appreciation these days is a mighty good stimulant, especially for the overworked editor.*

Scores of letters have reached MOTOR AGE since our first Winter Service number made its debut. To say that they were well received is putting it mildly, and we want you to know that appreciation of this kind is the stuff that spurs us on to greater efforts.

Read what our good friend, C. M. Ritchey, president of the C. M. Ritchey Motor Car Co., Joplin, Missouri, says:

"We have looked over this number and find many very interesting and new things, in the accessory line, also some novel window decorations. We have noted several helps in winter equipments, and their installation. The inserts and illustrations shown on business methods in use by different organizations over the country, are very interesting and helpful.

"Taking the number as a whole, we have found many things of service to the Automobile trade, and recommend it very highly."

And this from a friend whose motto is "Service that satisfies."

"I can honestly say that the magazine is remarkable in the value of its contents, reading matter is entertaining and instructive."

C. S. Richmond,  
Richmond's Auto Exchange,  
Salt Lake City, Utah.

### A 'La Jack Dempsey

"In my private opinion, you have tapped the retail automobile industry between the eyes, with a wonderful information which I hope 'they get' and 'get away with.' Come on with some more of it."

H. D. Howell, Manager,  
Howell Motor Co., Baltimore, Md.

### He Gets Right Busy

"Would like to tell you that the Nov. 6th or 'Winter Service' number of the Motor Age was 'just chock full' of mighty good suggestions and helps. Am very busy carrying out some of the suggestions."

V. I. Patnode, Manager,  
W. H. Stokes & Co., Bristol, Vermont.

### An Exporter says:

"We are especially interested in the issue of 'Motor Age' of November 6th, and we think that it is the best and most interesting Motor paper that we have ever come across.

"We wish to send one to each of our important motor dealers and we request that you send us 25 copies of this issue at your earliest opportunity, sending us a bill at the same time."

Dodge & Seymour, Ltd.,  
New York, N. Y.

### "Badly needed," says Mr. Chamberlain.

"It is our firm belief that education along these lines is the sort that is most needed at this time by the automotive industry, and we are very sure that the effort you have put into your Winter Service number will bear much fruit."

Cadillac Motor Co., of Denver,  
P. E. Chamberlain, Gen. Mgr.

### Adopting Suggestions Offered.

"We are pleased to say that we received and read same with considerable interest and are adopting some of the suggestions offered therein on winter business."

C. A. Wheelock,  
Wheelock Auto Co., Fargo, N. D.

### And Texas Hasn't Forgotten, Either.

"You have a number of good suggestions and some splendid new ideas in this number which I am sure will help every reader of the Motor Age whether he be distributor, dealer or user of motor cars."

F. E. McLarty, President,  
McLarty Motor Co., Dallas, Texas.

And this is but a small portion of what is coming. Our editors will continue "to tap the retail Automobile Industry between the eyes" as Mr. Howell remarked—Watch out for them!



THE Nash policy of furthering the Nash dealers' interests in every possible way is reflected in the desire of the Nash distributors to assist the dealer in building a profitable, permanent and constantly increasing business. That Nash dealers are successful in a financial way is evidenced by the heavy demand for Nash products received by us from all parts of the country.

### *Nash Passenger Cars*

5-Passenger Car, \$1490 2-Passenger Roadster, \$1490 Sedan, \$2575  
4-Passenger Coupe, \$2350 7-Passenger Car, \$1640  
4-Passenger Sport Model, \$1595

### *Nash Trucks*

One-Ton Chassis, \$1650 Two-Ton Chassis, \$2250  
Nash Quad Chassis, \$3250

*Prices F. O. B. Kenosha*

**The Nash Motors Co., Kenosha, Wis.**

*Manufacturers of Passenger Cars and Trucks  
Including the Famous Nash Quad*

# NASH MOTORS

VALUE CARS AT VOLUME PRICES

# MOTOR AGE

## Selling Service Intelligently



Chamberlain likens the dealer's service department to the lower half of an hourglass with the car owners as the upper half. The neck of the bottle is the point of contact between your business and the public. Good service salesmanship makes that point of contact. It keeps golden sand flowing unrestricted from public to service.

If You Transact Service With the Customer in the Way  
He is Accustomed to Do Business, Most of  
Your Service Troubles Are Over

There has been no more important message ever delivered to dealers than P. E. Chamberlain, Manager of the Denver Cadillac Co., gives on the following pages—If you do not read anything else in this issue **STUDY THIS**—Chamberlain is one of the men who has solved the dealer's service problem successfully and has made it pay both as service and as a **NEW CAR SALES GETTER**.—Darwin S. Hatch, Managing Editor.

# Your Service is the Most Important End of Your Business

## SELL IT INTELLIGENTLY

**T**HIS service of ours is business—too serious a business to be mixed up with a lot of funny stories. So serious, in fact, that it is today the most important part of the industry and, as the years come and go, it will continue to be the most important part. In the past many automobile concerns have gone to the wall because of their failure to sell service intelligently. Perhaps they have not known the underlying cause of their failures for the reason that, had they analyzed this thing of selling service in advance, they would not have failed. In the years to come those of you who place the importance of your service in its proper relative position to rest of your departments and organize yourselves to sell that service intelligently are likely to furnish the examples of the successful automobile merchants of the next decade.

### Sell Service Like Other Product

Service is not a thing which can longer be sold in a space containing a certain amount of hot air and "bull," surrounded by four rough brick walls. Unless you are willing to recognize this fact—unless you are able to see the change both in the trade and the public toward service, you had much better close out your business when you go home from this meeting and engage in a business in which the public does not have to be considered, if such a business exists.

Mr. Public is a peculiar individual. He is your "meal ticket," and upon his favor—whether he dislikes you or likes you—depends your bread and butter—your business success. Therefore, since you have no way of changing his peculiarities, you must cater to them. Mr. Public, is a likable cuss if you take him right and meet him upon ground with which he is familiar. It is like this: You live in Cleveland and I live in Denver but customs are very much the same both places. There are the same sort of stores, operated upon much the same systems. There are street cars which have transfers. There are theaters and hotels and cafes—everything but polished rails. And so, as we travel about in our own country we feel very much at home. The arrangement of each hotel, theater and store is a little different from those in my town—but I have no difficulty in doing business in them. But suddenly transplant me to a foreign city—where every custom is different and I am at a loss how to proceed. I do not speak the language at all.

And this feeling of being "lost" comes to the average automobile owner when he enters the average automobile service station or garage. He is on unfamiliar ground. Everything is done differently from the methods followed in the stores with which he trades for his other neces-

By P. E. CHAMBERLAIN  
(Manager Denver Cadillac Co.)

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*Automotive service is the only business which tries to sell its products AFTER delivery. Mr. Chamberlain told the Ohio dealers in their third annual convention at Cleveland last week. He SELLS his service first and herewith tells you how he does it.*

---

sities. And this feeling which comes to him is not one which makes for his friendship either for your establishment, individually, or for your trade as a whole. The unfavorable opinion which the trade has along this line from automobile owners strikes at every branch of our business—new car sales, used car trades and sales and at our general reputation—the thing which hurts us the most. For none of us—individual or corporation—can exist and prosper unless our reputation in the community in which we live is good.

### Service Most Important Part of Business

Your service is the most important end of your business. You may think that your new car sales are more important—or the sales end of whatever it is that you give service upon. On the other hand your service is your best salesman of new goods. Your man who sells the new goods may spend a few hours or a few days in the aggregate with your prospect but the department which sells your service is depended upon to hold the good will, for the years to come, of the prospect who has now become your customer. How long he remains your customer, is a matter which is entirely out of your hands or those of your salesmen. It lies entirely with your service departments as to whether you get a repeat order.

Get your thoughts on that repeat order. Intelligently sold service makes repeat orders and repeat orders are the staff of life to the success of any merchandising business.

I said that many concerns in this business had failed because they did not have a proper conception of the value of service and did not sell it intelligently. I did not say that these failures were due to a lack of properly delivering service. There is a distinction, of which I shall speak later, because I think that in this distinction lies much of the trouble we have with the public we serve.

### What Is Meant by the Word "Service"?

First, however, I wish to give you the meaning of the word "service" as I understand it when applied to the automobile industry.

Among several definitions of the word in the Century Dictionary I find these:

"Act of one who serves."  
"Assistance rendered."  
"A duty performed."

These three definitions cover automobile service. For certainly we "serve" in the sense that our service departments are organized to serve the needs of automobile owners. Certainly our service is "assistance" rendered, for without it at a time when it is needed, the automobile becomes useless in the hands of its owner or driver. And again our service is a "duty performed" since it is our duty properly to serve the owner who brings his service needs to our door. And in the degree in which we "perform our duty" to our patrons, in just such degree will our business prosper.

### What Is Service?

Service as I understand it is something which we must first sell and then deliver. Much more important of the two is the selling.

I do not speak of service in the former meaning of the word AS SOMETHING TO BE GIVEN FOR NOTHING. The man who still figures it that way has never gotten out of the kindergarten class, whereas most of us are ready for high school and a few of us, perhaps, are in college. There is a platitude about "giving something for nothing" and I think that we all, in this enlightened day and age admit that to do so is not sound business—that it is not asked of us and is not necessary for any reason under the sun.

Service is the ability to serve. Service is courtesy. Service is organization. Service is efficiency. Service is friendliness. Service is cleanliness. Service is square dealing. Service is the Golden Rule.

And if service be all of these, and much more, still it is nothing unless it is sold intelligently.

Because of the understanding of the word which has carried down in the mind of the public from the days when service was a thing to be despised by owner and dealer alike, I wish the new order of things could have a new name. I wish that no taint had to cling to the name we use to designate this wonderful, interesting part of our business, as it is to be during the years to come. But, unfortunately, the name is too deeply rooted to permit of a change. And being so we are going to have to strive all the harder to change public opinion concerning our service departments.

Now, let us come back to the difference between delivering service and selling service and let me see if I cannot justify my statement that the most important part of our service is its selling.

Generally speaking we deliver our service in good shape. That is to say most of the work we do on cars or tires or batteries—or whatever it is we are working upon—is well done. We hear much about mechanics not being good workmen. I do not believe that. Of course there are poor automobile workmen just as there are poor machinists, or shop repairers of watch makers. But I am of the opinion that the workmen in the responsible shop are, on an average, good workmen.

#### **Good Tools Important**

In addition to having good workmen we have good tools. The modern automobile repair shop is conveniently arranged and thoroughly equipped with modern machinery and tools. Its power-driven equipment is more, perhaps, than was formerly considered necessary in a machine shop handling an equal volume of work. Its small tools are numerous. In addition each workman has his own set of tools and, if he is a good workman, they are always clean and in order. Then we have automatic jacks, chain falls, motor stands, steam racks for cleaning parts and assemblies, well-equipped material stock rooms, vulcanizing machines—in short we have all the facilities for turning out good work.

Why is it that we are unable to collect our repair bills? Why is it that, having performed a job well with our good workmen, good tools and good equipment we are unable to have our bills paid as a matter of course, just as the same owner pays his dry goods bill whether it is \$1 or \$1,000?

#### **Sell Work Intelligently**

It is because we do not sell our work intelligently. It is because we wait until the article is ready for delivery to sell the things which we should have sold before we accepted the order. It is because we are attempting, among other impossibilities, that of trying to reverse the universal rule whereby anything must be sold first and delivered after it is sold.

We must recognize this as the fundamental cause of our troubles. For, until we recognize the evil we are not in a position to apply corrective measures. And, having recognized the evil, having studied the problem from an analytical standpoint, we find our remedy all about us—in the method and system in use by merchants and the employers of labor everywhere in our own respective communities. And the application is so easy that, having applied

it, we wonder why we went through all these dark years of struggle.

We must sweep our establishments clean. Much that is traditional with us will go into the sweepings. Men who have been with us for years will have to be discarded because they are the old school and will not change. We have moulded public opinion into its present channels. And we, ourselves, are the ones who have the job of changing this channel. And we must do that by first getting right with ourselves. We cannot sell anything but goods which are right. We shall never, never be able to sell by the methods we have followed in the past and which are still being followed by a majority of service concerns in the various branches of the automotive trade.

#### **Must Train Salesmen**

We are the only business in the world which does not fully recognize the fact that it takes salesmen, specially trained, to sell to the public. It is no disgrace not to be a salesman. Millions of men are not—have had no salesmanship training. Lots of men can never be salesmen. They have not the liking for it—just as many of us could never learn to be artists no matter how hard we might study. In every business there is a fine point of contact with the public with the mass of automobile owners on one side and the success of the business on the other. And at that point—that neck of the bottle—through which must flow your patronage you must place a salesman.

We are the only trade in the world which places no other check on its labor than that kept by the laborer himself. If you doubt this look around you. Talk to contractors, to railway men—anyone who employs labor of any kind. If a timekeeper is unnecessary why are they ever employed? If a small body of men can keep their own time with proper protection to house and patron, why wouldn't the saving be multiplied in direct proportion as the number of men increase and several timekeepers become necessary? You must have in your labor departments a check on your time which is absolute. You wouldn't think of allowing anyone to dip into your cash drawer, take out several thousand pennies and throw them out the second story window into the street? Cannot you realize, men, that every time the clock ticks that is, in effect, what is happening because, if your men keep their own time cards, you do not know how all of the

labor hours you pay for are being used. You know about the time you sell. Ah, yes. But that is, on an average, but 70 per cent of the time you pay for. What of the rest of it? What of the non-productive time—the expense time—the idle time? Do you know about that, down to the last penny?

#### **Must Establish System**

We are the only business in the world which does not recognize the fact that any system which adequately protects both the business and the patron must, of necessity, cause some delay. And, so, if we are on a cash basis and an owner is too hurried to wait for his bill—something he would have to do any place else under the sun—we let him go. We break our system and with it goes his respect, the respect of the men whom we have instructed to enforce the system and, usually, the collection itself. When this owner goes up in the air at a five-minutes' wait, why not sell him on the reason for the wait—show him how he waits in dry goods or clothing store, at bank window or theater box office. Sell him—and have a man there who can do it.

#### **Cleanliness Is Vital**

We are the only business in the world which does not recognize the fact that there must be cleanliness, order and system everywhere, but more especially at the point of contact with the public. If we were a nonentity as a trade it might be different. But we are not. The spot light is upon us all the time. That makes it harder for us, but by the same token makes the job before us all the more necessary. The shoe maker works up-stage in the dark. Who ever heard of a bunch of men at a club dinner table talking about a job of shoe-repairing? But the automobile man works down-stage with lights on him from top, both sides, bottom and in front. Because whoever heard of a bunch of men sitting at a table together who failed to discuss their automobiles and the last repair bill?

Today we recognize that America has one job which is paramount to everything else. That job is to breed nothing but 100 per cent Americans during the next generation. And the job before us, as automobile men, is just as clearly defined. It is to breed, in the next generation, nothing but 100 per cent automobile merchants whether, as an individual, we are selling new cars, trucks, repairs, tires, batteries or storage.

## **SELLING SERVICE—ISSUE OF DECEMBER 18**

**NEXT WEEK IN MOTOR AGE MR. CHAMBERLAIN WILL HAVE AN ARTICLE ON  
"THE THREE FACTORS IN SELLING SERVICE INTELLIGENTLY"**

# Better Business Methods in Service and Advertising Keynote of Ohio Dealers' Convention

CLEVELAND, O., Dec. 6—That the great problem of merchandising automotive equipment must be solved by better business methods on the part of motor car dealers was the burden of the talks delivered before the third annual convention of the Ohio Automobile Trade Association at Cleveland last week. Six hundred members of the association went home impressed, if not fully convinced, of the idea that they are essential parts of the greatest business in the world and that upon their efforts and their ability rested the development of the automotive business.

An innovation was introduced this year for the afternoon session of the first day and the morning session of the second day of the convention. The dealers divided themselves into sections and round-table discussions covering the different branches of the automotive trade were held at the Chamber of Commerce building and the various hotels. These round tables were Passenger Car Dealers, Truck Dealers, Garage and Service Managers, Tire and Automobile Equipment Dealers, Electrical Dealers and Tractor Dealers. Topics of peculiar interest to each of the departments of the business were discussed more or less informally and the results reported back to the convention, as a whole, and embodied, so far as the sense of the association is concerned, in the report of the resolutions committee.

The importance of the merchandising of automotive equipment was the keynote of the morning session of the last day of the convention, and was struck by Ray W. Sherman, editor of Motor World, who emphasized the fact that the automotive trade had passed through the period of invention and development, also that of production, and now was standing upon the threshold of the merchandising era. He pointed out that the dealer would have to use better and more aggressive business methods in the future if he would hold his relative position in the trade, and gave concrete illustrations of what such better business methods should be.

From a different angle this same subject was approached on the afternoon of the second day by F. W. A. Vesper, president of the N. A. D. A., who gave in the form of pithy epigrams the essential characteristics of the successful dealer of the future.

The value and necessity of organization in the automotive trade was presented by F. S. Cullen, managing editor of Automobile Trade Journal, and the importance of consistent and appropriate advertising by John O. Munn, of the John O. Munn Co.

## Vesperisms

*Pithy paragraphs from the talk of F. W. A. Vesper, President of National Automobile Dealers' Association before the convention of Ohio Automobile Trade Association at Cleveland last week.*

Get acquainted with your competitor—you may like him.

The dealer who complains about the business methods of another better check up his own methods first.

Give your competitor credit for the same motives as your own.

If there are bad business practices in your town you better fix them—if they cannot be corrected better move to some other town.

Don't apologize to anybody for your business—fix your business.

A real sale is one that pleases everybody—even the bookkeeper.

The sale with a kick in it is the wrong kind of a sale to make.

There is no reason why you should take in a used car, unless you can make money on it.

The average sale of an automobile brings in \$747. You sell a \$747 piece of merchandise. Have you a sales place worthy of goods of that value?

No man can make a sales talk through a cigar or cigarette.

Don't knock—you can't saw wood with a hammer. The carpenter who uses a hammer most usually is a rotten carpenter.

When you help the other fellow's business you help your own.

"Help your competitor sell his cars—yours will sell themselves." This is the slogan of the Ardmore, Okla., dealers and it is worth adopting.

The feature of this session was the address of P. A. Chamberlain, manager of the Denver-Cadillac Co., Denver, Colo., who spoke on the subject, "Selling Service Intelligently." A detailed report of Mr. Chamberlain's address appears elsewhere in this issue of Motor Age.

Harry Mooch, secretary of the N. A. D. A., addressed the convention at the close of the morning session of the third day and with a series of graphic charts he depicted the development of the automotive trades to date, some of the problems confronting the dealer for solution, and showed how by organization and better business methods these might be solved.

The result of the convention, whether intentional or not, was to convey to the dealers the impression that they were members of a dignified and important industry, whose future development depended upon their individual efforts and that they could not afford to countenance anything in the way of business practices which would be in any way detrimental.

The attitude of every speaker was essentially practical and concrete, there being less of theory than usually is the case at dealers' conventions. That the dealers sensed this fact, and that they realized that there was something to be learned every minute was indicated by the fact that the attendance was almost 100 per cent at every session of the convention.

The entertainment feature consisted of a theater party on Wednesday evening and a banquet on Thursday evening at which more than 800 representatives of the automotive trades were present. The usual incidental features of convention entertainment were also in evidence.

No formal action was taken at the tractor round-table but some of the problems of the tractor business were discussed informally.

It was the unanimous opinion of the dealers attending this section of the convention that because of his sales methods, service organization, and general efficiency the motor car dealer was without doubt the best equipped man in every community to handle tractors. The present difficulty seemed to be the doubt of making the business profitable under conditions as they exist at this time.

Fortunately the round-table was attended by several dealers who had been more than ordinarily successful in handling tractors and their opinion was unqualifiedly that, even with conditions as they are, it is possible for the motor car dealer to make the tractor business profitable, provided he charges legitimately for all of the service he renders after the delivery and preliminary instruction on a tractor.

At the same time, it was pointed out that the dealer who is competent to handle his own sales and service and who does so is entitled to a better rate of

(Continued on page 17)

# Coal Shortage Hits Motor Industry

## Detroit Factories Forced to Lay Off Men and Cut Production—Other Centers Not So Badly Affected

**A**LMOST complete temporary paralysis threatens the motor car industry as a result of the coal strike. The situation in the Detroit district, where many of the plants already are closed entirely and many more are threatened, is worse than it is in the Chicago district. Here most of the plants are still running on 6½-hr. basis and some of them have reserve stocks of coal sufficient to keep them operating indefinitely on that basis.

While thousands of men are out of work at Detroit, few men have been laid off in the Chicago district so far and with the present hopes for a speedy settlement of the strike and a resumption of mining it is hoped the crisis there can be passed without laying off more than a few men.

### Chicago Plants Running

Chicago plants such as the Stewart-Warner Co., the Stromberg Motor Devices Co. and others, dependent upon the Commonwealth-Edison Co. for power, are running on restricted time and will be affected merely by the ability of the power company to take care of them. It appeared Saturday as if power would be taken away from all non-essential plants, but the hope of strike settlement modified the threatened restrictions and Monday power was furnished to both essential and non-essential industries on the 6½-hr. basis.

At Racine, coal deliveries were shut off Saturday, but the plants there, the Mitchell Motors Co., the J. I. Case Threshing Machine Co., and others, have reserve stocks of coal which will enable them to run for some time. Mitchell has enough to keep going for two or three weeks, while the Case company has enough for a week or ten days and hopes the strike will be settled and coal deliveries resumed by that time, else it will be necessary to cut down on time and production.

### Tractor Firm Is "All Set"

The Parrett Tractor Co., Chicago Heights, has reserve stocks which will keep the factory running on the present basis for from six to eight weeks, while the Elgin Motor Car Corp., Argo, Ill., reports that it has reserve stocks to see it through until March.

Nash, at Kenosha, is in the worst shape. The company has coal enough to last through the present week, but unless supplies can be received by the end of that period the factory will suffer almost a complete shutdown.

As stated previously, few if any men have been laid off in the Chicago district up to the present time and if the hopes

for the settlement of the strike are realized and supplies of coal are received within a week or ten days there will be little trouble of that kind.

### Detroit Is Paralyzed

Drastic orders for fuel conservation practically paralyzed the automobile industry in Detroit Saturday and notices posted, closing factories, threw approximately 50,000 automobile and accessory workers out of employment. Other factories announced meetings Monday when it is probable they too will close down until resumption of mining assures sufficient fuel.

The order closing the factories came following notice sent out by the Detroit-Edison Co. that it had been ordered to reduce its consumption of fuel to one-fifth normal. The plant supplies about 70 per cent of the automobile and parts and accessory factories. While some of them will attempt to keep parts of their factories in operation with their own power plants supplementing the one-fifth allowed by the Detroit-Edison Co., the majority of them will close down entirely.

It was said Sunday, despite optimistic reports from Washington, that the factories which closed Saturday and those which will post closing notices Monday, will not reopen for a week at best and as many of them will take advantage of the opportunity to take the annual inventory it is probable they will remain closed for at least two weeks.

### Fear Disorganization

Fear is entertained that closing the factories may have a tendency to cause many of the employees to leave and the problem of maintaining the organizations and keeping up the morale of the employees is the chief topic with production managers, and heads of the employment departments.

All plants of the Studebaker Corp. in Detroit were ordered closed down by the officials following a meeting Saturday after receipt of the order posting the ban on the Detroit-Edison Co. The Studebaker order throws 5000 men out of employment. Continental Motors Co., which is dependent on the Detroit-Edison for power, laid off 800 men Saturday.

Federal Motor Truck Co.'s factory manager said the company was dependent entirely on the Detroit-Edison Co., and would have to close down. Timken-Detroit Axle Co. posted a closing notice Saturday, effective this morning, throwing 5000 men out of employment. Fisher Body Corp. closed Saturday, the shutdown affecting 14,000 employees.

The Packard Motor Car Co. will not be affected immediately as it has a supply of coal on hand to permit of the operation of its own power plant. Officials count on the acute situation being relieved before their fuel is exhausted. Maxwell Motor Car Co., and the Chalmers Motor Co. have been closed down since Dec. 1, for the annual inventory. The plant was to have been reopened Dec. 10, but it is not likely that operations will be resumed on that date. Officials of the company Saturday denied that they had closed down for lack of material or parts though it was admitted that the inventory heretofore had been taken in January.

Dodge Brothers plant closed down Saturday releasing 18,000 employees, and it was stated by officials of the company that there was no telling when the plant would resume operations.

### Many Thrown Out of Jobs

The closing of the Hudson Motor Car Co. plant Saturday also threw 6000 employees out of work. The Hudson and Essex production schedules for 1919 practically have been completed and it is doubtful if the plant reopens before Jan. 1.

The Cadillac, employing 7000 men, has coal enough for three days but will have to close unless supplies are available after that time. The Columbia Motor Car Co. will close tomorrow. The Saxon plant has shut down, throwing 200 men out of employment.

Hupp, King, Packard and Paige are operating on their own power and have laid off no men to the present time. The Ford plants both motor car and tractor, are running on their own power and hope to keep the working organization intact. Only a few men from the Ford plants have been laid off.

### 75,000 Men Out of Work

A conservative estimate of the number of men out of employment in the automotive industry at Detroit is 75,000, with the possibility of that number being doubled early this week unless relief is experienced at once. A serious situation and one which will affect motor car production adversely is precipitated by the enforced closing of many of the companies making parts necessary to the car manufacturers.

Here and there plants are resorting to novel expedients to keep running. For instance, the Locke Pattern Works, Detroit, employing 200 men, is utilizing the power of Ford runabouts to keep its machinery moving and to hold its men.

The Avery Co., tractor manufacturers of Peoria, Ill., is running its factory on power furnished by its own tractors.

# Shows Supplant National Tractor Demonstrations

CHICAGO, Dec. 8—Two or more winter tractor shows and a total discontinuance of all national and regional tractor demonstrations won the unanimous endorsement of the Tractor Division of the N. I. V. A. at the annual meeting of the division here last week.

The utter futility of big tractor demonstrations was so emphatically determined at Wichita and Aberdeen last summer that but one dissenting opinion was expressed when it was proposed to do away with them for the future. And on vote even this one dissenter joined the majority.

Informal approval, however, will be given one-day demonstrations by local dealers, participation in which will be up to the individual initiative of the manufacturers.

In lieu of national field demonstrations there will be two or more officially approved winter tractor shows similar to the Kansas City show of the last few years. These shows will be directly under the control of the national association.

The action of the Tractor Division will not affect the shows that have been approved for this year. These are three, namely, the Minneapolis show, Jan. 31 to Feb. 7; Wichita, Feb. 9 to Feb. 14, at Kansas City, Feb. 16 to Feb. 21. Authority over national shows will be assumed by the association next year.

The old show and demonstration committee of the Tractor Division is discontinued and will be replaced by a new committee to be known as the National Tractor Demonstration and Show Committee.

The division did not decide upon how many shows should be held nor as to

their probable location, but opinion seemed to be in favor of at least two western shows and one in the middle west. Ultimate decision on this matter rests with the committee.

The division did not decide upon how bidding any member of the association participating in any tractor show not officially authorized by the committee on penalty of being debarred from participation in the official shows.

## NASH WITH BEAVER ENGINE

Cleveland, Dec. 8—W. H. Nash, formerly in the sales department of the Timken-Detroit Axle Co., Detroit, has accepted the position of sales manager with the Beaver Mfg. Co., Milwaukee, Wis., manufacturers of a four-cylinder tractor engine and a six-cylinder passenger car engine.

## CAR PRODUCTION IS CUT

Detroit, Dec. 6—Production figures in the automobile factories in the Detroit district show a reduction for November, due in a measure to the scarcity of steel and coal and a desire on the part of manufacturers to conserve their stocks insofar as possible. Production of the Maxwell company dropped more than 200 while the output of Chalmers was cut in half. Packard production was reduced almost one-half, while Overland output

increased 200. A considerable reduction was shown in the output of Hudson and Essex cars though production was kept up to the yearly schedule.

Figures for the year 1919 with estimates for 1920 will be given out by all manufacturers for publication immediately after the close of the year. Some few production programs for 1920 already have been announced, including Overland, 200,000; Hupp, 24,000; Columbia, 15,000; Hudson, 30,000; Essex, 40,000; Saxon, 12,000. Hupp and Paige plans call for an output of 1800 cars in December to complete the 1919 schedule. Scripps-Booth will try to reach 1000 and the Overland schedule for the present month is 600 cars a day.

## STEVENS DURYEA GETTING UNDER WAY

Chicopee, Mass., Dec. 6—The Stevens Duryea Motor Co., which was revived recently, is now getting under way with its models for demonstration to be shipped to the dealers to be exhibited at the motor shows. George E. Twitmeyer, the former advertising manager for the Peerless, who has been made sales manager, is getting acquainted with the new job and shortly the company will be able to announce the names of dealers in the big cities. George E. Canterbury, who sold Stevens Duryea cars while with the J. W. Bowman Co., of Boston, that handled the line for years until it stopped, has been given the agency for Boston and that territory. He has been selling Simplex cars. The plant will give employment to 2000 when under full headway.

# N. A. D. A. Convention Set for Chicago Show Week

CHICAGO, Dec. 6—Members of the National Automobile Dealers' association will hold their annual convention here during Automobile Show week as usual. Notices of the meeting have been sent to all members of the association setting Jan. 26 and 27 as the dates of the convention and naming the LaSalle hotel here as the place of the big event.

Chicago has been selected as the place and Automobile Show week as the time principally because the Chicago show generally is regarded as the most important of the year. Although it is later than the New York show and the attendance is about the same, the Chicago show has come to be known as the big business event of the season, more dealers attending this exhibition than any other of the year.

While the notices of the dealers' association convention specifically state that there will be "NO business," it is expected that considerable will be transacted. The annual gathering in Chicago for the Automobile Show always brings an interchange of ideas between the deal-

ers from various parts of the country which has in the past proved far more beneficial to them than any set business schedule could possibly do.

## MYERS HEADS BALTIMORE DEALERS

Baltimore, Md., Dec. 8—E. R. Myers, president of the Motor Car Co., Overland distributors, and one of the veteran motor dealers of the city, was elected president of the Baltimore Automobile Dealers' Association, C. H. Reeves, Jr., manager of the Foss-Hughes Co., Pierce-Arrow distributors, was elected vice president and Walter Scott, the Marmon distributor, was chosen secretary and treasurer. Pres. Myers together with the following make up of the Board of Directors of the association—Walter F. Kneip, former president of the association, and manager of the Franklin agency; E. T. Backus, president of the Backus Motor Co., the largest Ford dealer and the Fordson distributor; A. H. Bishop, manager of the Autocar Sales and Service Co., and W. L. Duck, manager of the Winton Agency. John C. O'Brien is correspondent secretary.

## DOUBLE SPACE FOR MINNEAPOLIS TRACTOR SHOW

Chicago, Dec. 8—Double the space used last year has been allotted to tractors for the Twin City Automobile, Truck, Tractor and Industrial Exposition, which will be held in the Overland building in St. Paul the week of January 31 to February 7. Last year the tractor exhibit occupied 24,000 sq. ft., and this year will cover 50,000 sq. ft.

The Minneapolis show always has been wonderful, in many respects more notable than is any other automotive show held in the country. Last year it was held in the exposition building and was, as far as tractors are concerned, second in importance only to the Kansas City show which followed it. This year it is planned to make the show better and far more comprehensive. During the last year rapid advancement has taken place in the production of tractor drawn and tractor operated machinery.

The Dealers' Association is more active today than it has been at any time since its organization. A new club house on North Charles street provides a new opportunity for the dealers to gather at various times for social intercourse and it is already productive of much good from a business standpoint.

#### LAFAYETTE READY SHOW WEEKS

Chicago, Dec. 8—American motordom will have its first opportunity to inspect the new LaFayette car during the week of the New York Automobile Show, Jan. 3 to 10. The latest creation of D. McCall White will be exhibited in the main lobby of the Hotel Commodore.

The apparent exclusiveness of the LaFayette is due to the practice of the National Automobile Chamber of Commerce, which bars the doors of the New York and Chicago shows to any car which has not been in production for at least one year. This edict makes imperative a private hearing of the LaFayette, which, six months ago, was only in the blue print stage of development, but which has been translated into metal for constant test and improvement during the intervening months.

#### TRUCKS SET MARK

Spokane, Wash., Dec. 8—Establishing a mark of 12 hr., 18 min. actual running time for 230 miles from Spokane to Lewiston, Idaho, and return, a truck driven by Henry Gohrman, carrying a two-ton capacity load, set a road mark over rough winter highways for truck drivers to "shoot at" for some time to come.

## Pandolfo Found Guilty of Fraud by Federal Courts

CHICAGO, Dec. 8—Samuel C. Pandolfo, who has been in the limelight for the past two or three years as the promoter of the Pan Motor Co. of St. Cloud, Minn., was found guilty here Saturday by a jury in the Federal Court of the United States of using the mails to defraud. The twelve other directors of the company were freed from charges of conspiracy. The case has been on trial for nine weeks before Judge Landis and a verdict was rendered after nineteen hours' deliberation.

Pandolfo was found guilty on four counts. All dealt with the mailing of letters to prospective stockholders and misrepresentation of the Pan company's progress and development by stock salesmen. Each count carries a penalty of one year in prison or a fine of \$5000 or both. All of the defendants were charged with both the misuse of mails and with conspiracy, but the eight St. Cloud business men who have been made directors of the company since the plant was started at St. Cloud were dismissed from eight of the eleven indictment counts.

A motion by the defense to set aside the verdict of guilty was dismissed by Judge Landis but he announced he would

## Kentucky to Open Up its Beauty Spots to Motorists

KENTUCKY no longer will be as a sealed book to the ambitious motorist. Trails in the most picturesque nooks and corners of the "dark and bloody ground" are being opened to the outside world through state and Federal highway aid.

The famous Bluegrass country, the mountains immortalized by John Fox, trails which have remained untouched by civilization are being linked by broad permanent highways. Millions of dollars have been pledged and next spring will see one of the most aggressive road building programs ever attempted in the state, under way.

#### Follow Old Trails

Some of these roads will be built over roads—built and mapped by French engineers over a century ago—which served as the only means of communication with the interior of the state before the advent of the railroads. Modern engineers have said that these roads are as near "perfect" as roads can be, especially in the way the routes were selected so as to bring out the beauty of the surrounding country.

The Louisville-Paducah highway, known as the river road, to be constructed at a cost of \$3,000,000, now is being mapped. Engineers have completed plans for more than half of the route, and the remainder will be mapped during this month. Con-

tracts for the road will be let in February.

The Louisville-Daducuh highway, known as the upper river road has been financed with the exception of the stretch through Boone County. Only \$15,000 remains to be raised to assure this project. The road will cost \$2,500,000.

frame. The car is built of laminated ply wood, motor gears and driving mechanism being suspended in the wood body, which, the manufacturers claim, constitutes a frame of unusual strength. The body is metaled over and finished on the outside like any standard make. The manufacturers claim long tire mileage and low fuel cost as a result of decreased weight.

#### ACCESSORIES AT TWIN CITY SHOW

New York, Dec. 5—Announcement was made today by M. L. Heminway, general manager of the Motor and Accessory Manufacturers Association, that arrangements have been made with the Minneapolis Automobile Trade association, whereby members of the M. & A. M. A., will participate in the show to be held in Minneapolis from Jan. 31 to Feb. 7, 1920.

After a careful survey of the plan and jurisdiction of the Minneapolis show it was determined to sanction them because of the important territory covered. The automobile men of the Twin Cities are making special efforts to make the Minneapolis show one of the most important exhibitions in the history of the industry in the middle west.

To date the Motor and Accessory Manufacturers Association has sanctioned the automobile shows at New York, Chicago, Boston and Minneapolis. This is the largest number of official automobile shows sanctioned by the Association in any one year.

#### FIAT PLANS FOR AMERICA

Boston, Dec. 6—Announcement has just been made of the formation of the Turin Motors Co. here, which will handle the Fiat line for all New England except Connecticut. It will also have the Maritime Provinces. Lorenzo Avanzino, a prominent Italian importer, is president of the new company, and W. G. Tenney, a former Chandler dealer, is sales manager. Elmo de Paoli, just released from the Italian army after four years of service, is to direct the sales of Fiat cars in this country, with headquarters at New York. The Fiat Company plans to build 60,000 cars and will send many here. R. R. Ross, who sold Fiats in New England for several years, will devote all his time to the Columbia, and perhaps another line he is considering.

#### TO MAKE PLYWOOD CAR

Buffalo, Dec. 7—Production of 5000 cars in 1920 is the plan of the Parenti Motors Corporation, new manufacturing enterprise which has just taken quarters and begun work here. Within the past week territory covering five southern states has been awarded, orders for 3500 cars being received, it is said.

The Parenti will differ from ordinary motor cars in that it will have no steel

## Syracuse is Victor in First American Air Race

ROCHESTER, Dec. 6—Aviators representing the city of Syracuse won the first inter-city aerial derby in the United States here when they defeated the Rochester fliers by a margin of ten seconds. Thousands of spectators witnessed the contest from the two landing places, Britton Field, Rochester, and Bethka Field, Syracuse, and were thrilled with new interest in aeronautics and the possibilities of aerial transportation.

### Brewster Individual Winner

Pilot Morell K. Brewster, of Syracuse, carried off individual honors in the race by flying the two laps between the cities in 2 hrs. 25 mins. Pilot Filip Bjorklund, of Rochester, however, made the first time for one lap, making the distance in 1 hr., 3 min., 35 sec.

Cane was the first of the four fliers to hop off, leaving Britton Field in Rochester at 10:01 a. m. while the Syracuse aviators left their end of the derby a few seconds later. Bjorklund did not get away from Rochester until 10:25 a. m., his delay being due to the non-arrival of express packages designed to be carried on the trip.

Ice in the jets and wells of the carburetor of Brewster's machine nearly caused disaster to the aviator and was the only thing bordering on an accident in the

event. The first of the Syracuse planes to arrive in Rochester came in at 11:13:5, a. m., the machine being piloted by Gordon Hood. He brought with him as a passenger M. P. Byrne of Syracuse, who was scheduled to act as judge here. Half a minute later the second Syracuse plane arrived, carrying a load of mince meat from a factory in Syracuse. Brewster's plane touched the ground at 11:14 a. m.

Barney Cane and Bjorklund arrived in Syracuse 11:23 and 11:48 a. m. respectively. The Rochester score therefore stood 2:44 while Syracuse had 2:07½. On the return trip Hood was the first man to leave the Rochester field while Cane hopped off from Syracuse before Bjorklund.

Luncheons were served to the aviators by their rival clubs, the Rochester and Syracuse Aero Clubs. Cane and Bjorklund were the guests at the Yates Hotel and Brewster and Hood at Hotel Powers.

### BROOKLYN MOTOR SHOW IN FEBRUARY

New York, Dec. 7.—Announcement is made by the Brooklyn Motor Vehicle Dealers' Association that the Ninth Annual Brooklyn Automobile Show will be held in the Twenty-third Regiment Armory the week of Feb. 14 to 21. This an-

nouncement followed a meeting of the association held at the Long Island Automobile Club at which Clifford M. Bishop was elected president of the association. The other officers elected are Chester J. Maxson, vice-president; Fred Kengetter, second vice-president; I. C. Kirkham, treasurer, and W. A. Sellon, secretary.

For the first time in the history of the Brooklyn automobile show, both passenger cars and motor trucks will be exhibited on the floor of the armory during the same week. The passenger cars will be arranged in the center of the armory, while motor trucks will occupy the spaces on the sides of the interior. This combined exhibition of passenger cars and motor trucks is made possible by the exhibitors cutting down the size of their spaces.

### KANSAS DEALERS TO MEET

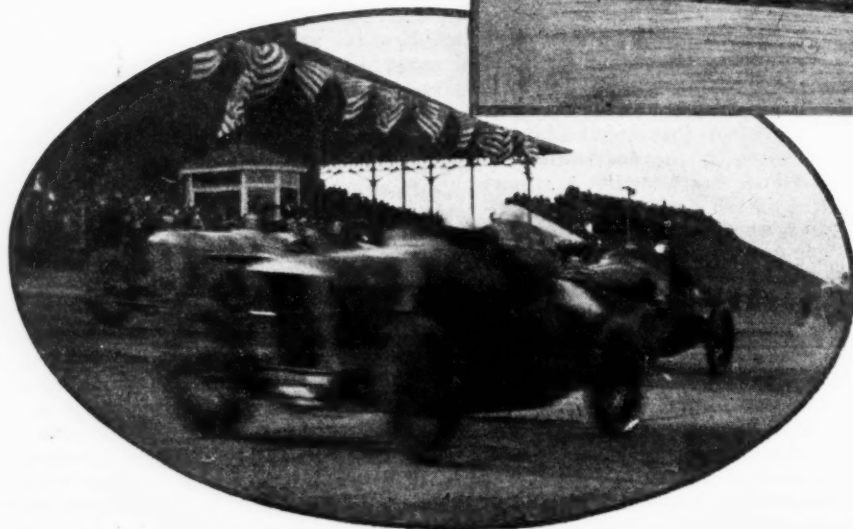
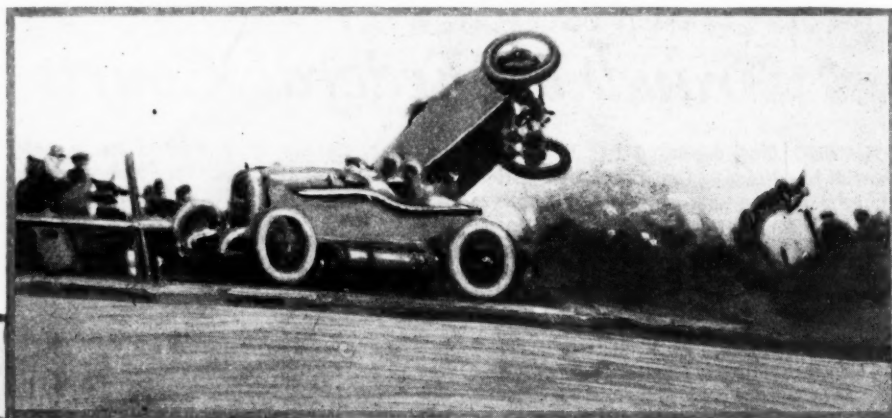
Wichita, Kan., Dec. 6—Members of the Kansas Automobile Trade association will meet here for their annual convention on Dec. 10. A complete program of events has been scheduled for the dealers with session both morning and afternoon. P. E. Chamberlain, a member of the board of directors of the National Automobile Dealers' association, is to make the principal address.

### BALTIMORE SETS SHOW DATES

Baltimore, Md., Dec. 4—Baltimore's annual Automobile Show, which will be exclusively for passenger cars, will be held in the Fifth Regiment Armory in this city Feb. 3 to 7, 1920, inclusive. It will

## Accidents Thrill at Ascot

Spectators at the Thanksgiving Day race at Ascot Speedway, won by Joe Boyer in a Frontenac, had their fill of thrills. During the race, Ira Vail's Stutz crashed into the car driven by Reeves Dulton and both drivers, besides three spectators, were badly injured. The remark-



able photograph here shows Vail's car just as it hurtled through the air after the crash. Below is a photograph of one of the numerous brushes which enlivened the race. Ascot Speedway is only a mile track and with numerous fast cars competing, there are far more of these brushes when drivers pass each other than on larger tracks.

be under the auspices of the Baltimore Automobile Dealers' Association. This will be the first show that will be run exclusively by the dealers' association, for in the past it has always been held jointly by the dealers and the motor club. The committee in charge includes—F. S. Bliven, president of the Standard Motor Co.; Arthur Stanley Zell, president of the Zell Motor Co.; Thomas G. Young, Auto Supply Co.; E. R. Myers, president of the Motor Car Co.; Walter F. Kneip, president of the Franklin Motor Co.; E. T. Backus, Backus Motor Co.; A. H. Bishop, manager of the Autocar Sales and Service Co.; W. L. Duck, manager of the Winton Co. John C. O'Brien is general manager of the show.

#### N. A. D. A. ATTACKS FAKE "SCHOOLS"

Cleveland, O., Dec. 5—So-called automobile schools whose courses of instruction are defective and whose diplomas mean nothing as a guarantee of mechanical efficiency are to be put out of business, if it is possible for the N. A. D. A. to do so. The pretensions of these alleged schools are to be thoroughly investigated and where they manifestly fall below the standard which will enable them properly to equip mechanics for automotive repair stations, they will be shown up by the association and their efforts to live off the trade frustrated.

#### DU PONT CAR NOT CONNECTED WITH POWDER FIRM

In its recent description of the new duPont motor car, *MOTOR AGE* erroneously intimated that there was a connection between the duPont Motor Mfg. Co. and the duPont powder interests.

E. Paul duPont, who is president of the motor company, is a son of Francis G. duPont who, at the time of his death was president of the E. I. duPont de Nemours Co. The son, however, is not at present associated in any official capacity with the powder company nor is there any connection between the motor and powder companies.

## Plan a Truck Reliability Contest for Next Year

DETROIT, Dec. 6—Motor truck reliability will be given the acid test in the first annual national reliability contest to be staged in the latter part of June, 1920, over a middle western course. Omaha will be the starting and finishing point for the tour which will cover approximately 2500 miles and will consume twenty-seven days, twenty-four of which will be devoted to driving.

The contest aptly has been named the "run around the money belt" for the section to be traversed includes the most prosperous region of America and never in its history has the great middle west been so prosperous as at the present, with record prices for crops and lands selling at unheard of figures.

#### Plants to Make It National Event

Plans for the tour call for elaborate staging that will compare favorably with any national event and it is expected to rival the great Glidden tours of the past, the lesson learned on the passenger car tours guiding the promoters in the effort to make this contest stand out pre-eminent. The route generally speaking will be from Omaha to Lincoln, Cheyenne, Denver, Colorado Springs, Pueblo, Hutchinson, Topeka, Kansas City, Des Moines, Fort Dodge, Sioux Falls, Sioux City and Omaha. The average daily run will be slightly in excess of 101 miles, with Sunday stops scheduled at Cheyenne, Colorado Springs, Hutchinson and Des Moines.

Handsome and expensive trophies will be offered, with the Omaha Bee trophy as the leader for the best performance of a truck in the contest, which will be limited to trucks of 3½ tons and under, all equipped with pneumatic tires. In fact one of the chief objects of the contest is to impress the wealthy farming population with the efficiency of pneu-

matic tires as applied to motor trucks.

Sanction for the run has been issued by the contest board of the American Automobile Association and Chairman Richard Kennerdell, of the contest board, has expressed the opinion that the event will outrank in importance any ever held for the motor truck industry.

Charles P. Root, veteran tour manager, who has been connected with a majority of the great touring contests out of Chicago, including two motor truck runs, will manage the contest as the representative of the contest board. S. P. LaDue of Omaha is resident manager and F. Ed Spooner of Detroit is promotion manager. Spooner also is a veteran in touring and pathfinding circles, dating from the Pittsburgh endurance run of 1903 since which time he has participated in all the annual passenger car and motor truck tours.

All trucks competing for the trophies will be stock models, registered with the A. A. A., and will be inspected at the start and finish by officials of the technical committee of the association. Observers will travel on the trucks throughout the run, each contesting truck going into controls at noon and night. Rules for the tour have been prepared by Root and his associates and passed upon by the contest board, which will have general supervision of the officials on the run, all of whom will be men experienced in the field.

#### TRACTOR SHOW DATES CHANGED

Kansas City, Dec. 6—The fifth annual National Tractor Show will be held Feb. 16 to 21 instead of Feb. 9 to 14. The postponement means more time for installing exhibits from the Minneapolis show manufacturers and exhibitors heartily endorse this change. Show space will be doubled this year.

## Small Cars Seem to Be Favored

STRIKING statistics showing a strong trend among automobile owners from big bulky cars to smaller machines, have been gathered by the Jordan Motor Car Co., Inc., of Cleveland, Ohio. Twenty men, stationed on twenty of the busiest street corners of the United States, from 4 to 6 o'clock in the afternoon of Nov. 8 counted the number of passengers in the automobiles that passed. The total number of automobiles checked was 37,424. Of these 23,380 were carrying one or two passengers.

These figures were obtained at the direction of Edward S. Jordan, president of the Jordan Motor Car Co., Inc. They are striking corroboration of the prediction that car owners would turn from the big carry-all cars to more compact quick-about machines.

A comparison of the figures gathered simultaneously in the twenty different

cities shows an interesting similarity. A man standing at the corner of Fifth avenue and Forty-second street, New York, counted 2464 cars. Of these 651 were carrying one passenger and 626 had two passengers. There were 345 cars with three passengers and 337 with four, while 280 carried five people, and 225 more than five. It was noticeable that only the lower priced cars habitually carried seven passengers.

#### Similar Figures in Other Cities

Similar figures were compiled by the Jordan representative stationed in Philadelphia. Standing at the corner of Broad and Chestnut streets, this man counted a total of 1873 cars, of which 550 carried one passenger and 528 two. Here again it was noticed that the largest number of passengers were carried in the cheapest cars.

The man standing at the corner of Euclid and Superior avenues, in Cleveland, checked 2095 cars. Of these 587 carried one passenger and 565 had two passengers. There were three passengers riding in 284 of the cars, and four passengers in 276. There were 219 cars carrying five passengers, and only 164, and those mostly small, low-priced cars, which carried more than five passengers.

In Chicago a man standing on Michigan avenue in front of the Art Institute, counted 2269 cars. The proportion of machines carrying but few passengers proved to be about the same as in the other nineteen cities. They ranked as follows: Cars with one passenger, 616; with two passengers, 594; three passengers, 313; four passengers, 305; five passengers, 248; over five passengers, 193.



# EDITORIAL



## Recognition for the Independent Garageman

THAT independent service stations in the last few years have progressed from sheer merit is beyond question. They have had no factory to foster their movements for bettering service. Yet in many cases they have outdistanced the factory's representative in the field simply because the dealer has been absorbed in his merchandising problems and has let his service worry along as best it can.



EXPERIENCE shows that real service is being given by independent service stations in spite of the fact that factories do their best to discourage these efforts for bettering service by refusing to give a fair discount on repair parts to these institutions. And the worst of it is that some factories know less about the problems of field service than those whom they are discriminating against, presumably for the good of the industry.

THE answer is simple. Service is bound to become a dominant factor in sales. Just how soon this will be at its height we do not know. It is liable to happen very quickly, as other things in the industry have. Undoubtedly some dealers must be aroused from their present attitude or they will be replaced by the independent garagemen.



CERTAINLY credit is due the independent garage for the good it has accomplished. This type of garage is good material for the authorized service station which seems to be receiving considerable thought from many factory service departments with a view of improving service on their cars in unallotted territory. Whether this assigning of service to stations other than authorized dealers is handled by the factory or the distributor in a certain territory, it is certain that this type of garage merits consideration.

## What of the Future Car?

IS the future car going to be smaller than the present car? Will its passenger carrying capacity be less? If we are to base our answer on the results of a test that was carried out recently by Edward S. Jordan, president of the Jordan Motor Car Co., we would say that the future car will be smaller in regard to its passenger carrying capacity; for in the test it was found that from a count taken in various cities over the country, out of 1200 cars passing a given corner on a week day, 453 carried one passenger, 411 carried two passengers, 160 carried three passengers, 122 carried four passengers, sixty-four carried five passengers, and only ten carried more than five passengers.



FURTHER information, taken from the insurance statistics and reports, show that the average American family

has five persons, which would further add assurance to our answer that the future car will be smaller than the average car of to-day.



IN the days when the neighbor's new car was considered a novelty it was rather the usual thing for the neighbor to act as a common carrier for everybody within hailing distance. The novelty of the new car next door is not what it used to be. It has become an occurrence of commonplace consideration; for the business man who resides in the suburb solves his transportation problem to and from town via motor car. Men of this character have learned that the "quick about" car is not the large car. These factors are constantly pointing to the car of the future as being small or smaller perhaps than what is now considered a family car.

## Designing Cars to Help the Service End

WHEN you have to put a mechanic on a five-hour job to put in a fifty cent part something is wrong—somebody bungled. If motor car designers, whose job it is to lay cars down on the boards could see some of the work necessary in service stations on some cars to get at an insignificant part, construction layouts on certain models of cars probably would be changed.



IT IS not uncommon to go into a service station and hear mechanics cursing the makers of some cars for having used a certain method of construction which makes the job hard to get at. Car owners, too, very often become dissatisfied with a repair bill when they see a heavy charge for labor against a few cents for a part. The fault may be with the

maker of the car, primarily, but a great deal of good might be accomplished if dealers would write the makers of the cars they handle regarding certain drawbacks those cars may possess towards speeding up service. Production methods are not likely to be changed unless there is agitation on the part of the dealers, who have to see to it that the cars are kept in condition after they leave the factory.



IT WILL be interesting to note at the shows this year whether the question of service on the new models has been given its share of attention along with better gear shifting methods, better spring suspensions and ability of engines to handle heavier fuels more easily.

## OHIO DEALERS IN MEET

(Continued from page 10)

discount than is the dealer who calls upon the factory for assistance in these two essentials. It was the consensus of opinion that effort should be made to induce the tractor manufacturers to recognize dealer efficiency and to make it worth while for the competent dealer to go into the business seriously.

It was also the unanimous opinion of the tractor dealers that in order to insure success in selling tractors it is necessary for the automotive dealer to departmentalize his business and handle the tractors distinct from motor cars or motor trucks. In this connection, also, it was pointed out that it was all essential to have men as salesmen who understand farming conditions, the operation of power-farm equipment and who are able to talk the farmer language and who know what the farmer wants.

Special emphasis was laid upon tractor service. Included in this is not only the right kind of shop equipment and competent mechanics, but also an adequate stock of spare parts. Some objection, however, is being raised among dealers as to the policy of some of the tractor manufacturers in the way of handling repairs but no definite recommendations for a correction were made.

QUESTIONS of service and repairs occupied the dealers at Cleveland not only in the full session of the convention, but also in the round table discussions. The round table devoted to service and garage men was exceptionally well attended and brought out interested discussion. It was conducted by Andy Auble of the Akron Auto Garage.

In opening the discussion Mr. Auble brought out the very pertinent question of the effects of labor-saving devices and efficiency methods in the shop on charges for the job. He emphasized the fact that the very great saving of time which accompanied the use of better methods and better equipment did not mean that it would be either wise or profitable to reduce charges to the customer in proportion to the saving of time.

Not only must the cost of the special equipment be carried by the charge for the work done but also the dealer and service man should profit by the fact that the customers' work could be turned out more quickly. He compared the service

department to a doctor or a lawyer. It is no more reasonable to charge the customer only for the time spent by the service man without taking into consideration his experience and equipment than it is to assume the doctor or lawyer do not take their previous training and equipment into consideration in making their charges.

He told the garage men and service men that they were not honest with themselves if they put in time-saving equipment and do not take some of the advantage, which this gives to the customer.

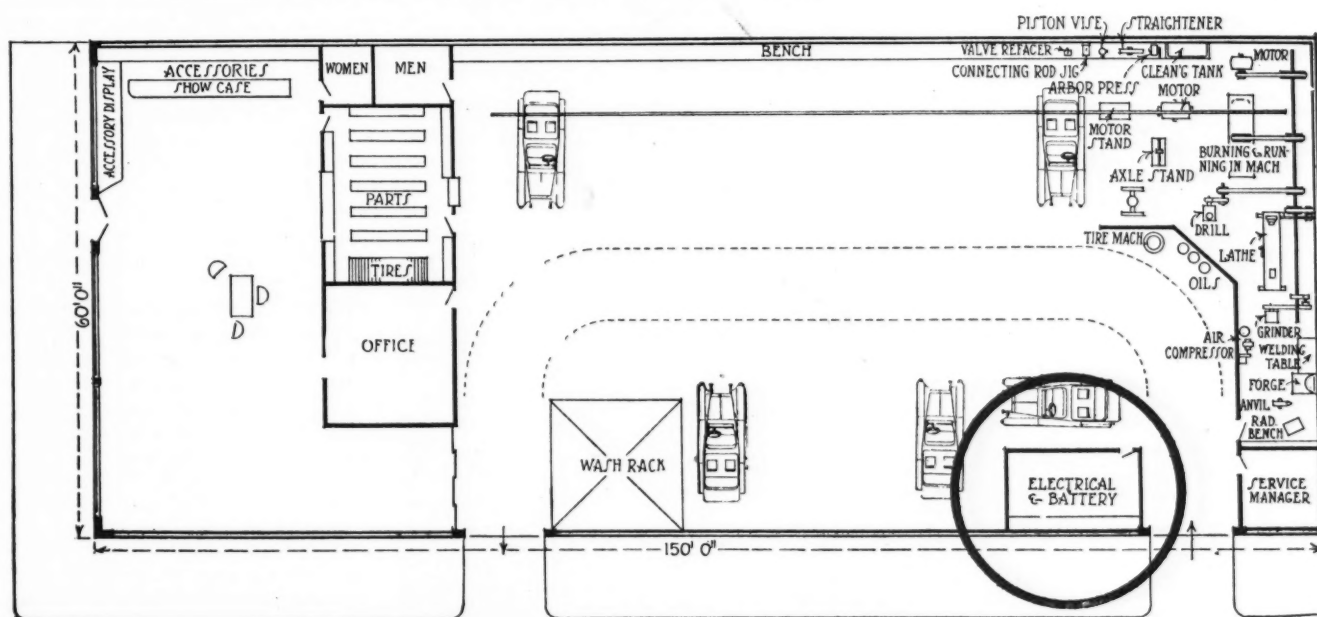
He urged his hearers to get to as near a flat-price basis as possible, a feature which was brought out more in detail by Mr. Chamberlain, of Denver, in his talk before the whole convention and which is reproduced on other pages.

## SET DATES FOR SAN ANTONIO SHOW

San Antonio, Tex., Dec. 6—With 162 passenger car, tire and accessory exhibits, exclusive of the tractor, balloon and airplane exhibits, San Antonio is to stage

## Equipping the Electrical Department of the Ideal Service Station—Issue of Dec. 18

In next week's issue of Motor Age we are going to show plan views, perspective drawings and other sketches showing equipment and layout of the electrical equipment in the Ideal Service Station described in the September 11 issue of Motor Age. In addition the story will tell why the apparatus was chosen and give the cost. With the ever increasing production of motor cars, trucks, tractors, and farm light plants the maintenance of automotive electrical equipment will become a bigger problem. Therefore, the service station well equipped to handle this work efficiently and quickly will soon make a name for itself. Whether the dealer expects to go into the electrical repair end of the business on a large or small scale, he will profit by reading next week's article.



Plan view of the Ideal Service Station, showing in circle, the electrical department, which will be featured in next week's issue of Motor Age.

the largest and most complete automobile show ever held in the Southwest. The dates have been set at Feb. 14 to 22, inclusive, an eight-day revelation of motorization possibilities.

The show is to be held under the direction of the San Antonio Automobile Trades association. The site is at the new factory plant of the Lone Star Motor Truck and Tractor Co., a local industry. Less than 100 exhibits were were had at the show last season. The main exhibit building is 80 by 450 ft., with 36,000 sq. ft. of floor space. Another building joins in the rear with 2500 sq. ft. of space. The association is having constructed a temporary structure about 50 ft. wide and 450 ft. long, adjoining the main exhibit building to house the trucks, tractors, balloons and airplanes. It will be the first time on record at the local shows that aircraft has been exhibited in connection with a motor display.

## Enforce Headlight Law

### Massachusetts Takes Steps to Make Measure Effective in 1920

#### Dealers See Opportunity to Get Rid of Stocks Piled Up When Law First Passed

BOSTON, Dec. 8—According to plans now under way by the Massachusetts Highway Commission motor car manufacturers are to have one year of grace to comply with the headlight law in this state. In other words, if the present intention of the Commission is carried out, all makers will be notified that it will be their duty in planning their 1921 product to see that the cars they ship to Massachusetts for sale will have some

device on them to meet the headlight law.

Instead of going after the individual owner the Commission will begin with the maker. Cars which are not equipped will be refused registration. Dealers will be notified that before a car is turned over to a buyer it must carry some sort of device. There was not time to carry out these plans this year, but the 1921 registration blanks will be so worded that owners will have to specify if they have cars that are equipped in any way.

During the past year the Highway Commission's investigators have been busy getting after offenders. The war had crippled its force, taking away some of the best men, but a few of them got back during the latter part of the year, and they were put out on headlight work. Several hundred motorists were held up throughout the state, and a number of them were haled to court and fined. Others were warned. A few had their licenses suspended.

As a result of the agitation there were many sales of lenses and other devices, and the dealers were given a chance to unload some of the surplus stock they had been carrying in anticipation of a crusade. They are not piled up with lenses in Boston now. What militated against the sale of many devices was the fact that the Highway Commission would not approve of any devices now on the market because all of them to some extent depended upon proper focusing of the bulbs. The commissioners took the attitude that if they approved any device and the regulations called for a low candlepower bulb the owners could later put in higher powered ones and defeat the law's intent.

### DE PALMA SETS ROAD RECORD

Rochester, Dec. 6—Ralph De Palma, in company with F. W. Davis, Australian representative of the Delco company, broke the record for an automobile run between here and New York city yesterday. De Palma and Davis, in a Cunningham roadster, left New York city at 5 o'clock Sunday morning, bound for Rochester. They were driving the car to the Cunningham factory in this city.

They took the road by way of Albany and at 4:58 p. m. rolled into Rochester. They had left Canandaigua at 3 o'clock, but got off the road and had to use 1 hr. 58 min. in covering a distance usually made in 45 min.

When they left New York rain was pouring. As they came north and west, the rain turned into snow, and in Central New York they encountered a full-sized blizzard. The trip was not a non-stop one, as the men were hungry along about noon and stopped for dinner. This consumed 1 hr. 42 min., so that their actual driving time for making the trip was 10 hr. 16 min. The previous fastest time was 11 hr. 13 min., made in 1917 by Harry Goodin of this city.

Davis had qualified as an A. A. A. representative before leaving New York city, and the time for the run will be presented to the contest board of that association for its approval.

## British Motor Car "Mascots"



"Mascots", or radiator decorations, seem to be more popular in England than in the United States. The above group of artistic mascots was shown at the Olympia Show recently, by Dunhill's, Ltd.

## To Limit Sizes of Tires

### European Manufacturers to Cut Down Number of Tubes and Standardize Valves

#### American Precedent Is Followed in This Move to Conserve Rubber

PARIS, Dec. 8—At a meeting of European tire manufacturers of France, England and Belgium, it was decided to limit the sizes of pneumatic tires to the following: 650 by 65 mm., 760 by 90 mm., 815 by 105 mm., 820 by 120 mm., 8880 by 120 mm., and 895 by 135 mm. for trucks only.

The retention of the first two sizes is doubtful, for these may later be replaced by the inch size of 30 by 3½. All these tires have clincher beads. It is understood that tire manufacturers in the four countries concerned will go into regular production on the above sizes only. Other sizes which may be called for by automobile manufacturers will have to be built specially and consequently will be more costly.

An effort is being made to standardize tire valves. At the present there are in Europe two sizes of valves, the later of which has a much smaller diameter than the older model. It is intended that the small diameter valve shall be adopted eventually, but up to the present no official action has been taken. America was not present at the European Tire Standards Conference.

The Paris Salon showed that the size of tire which will be most generally employed next year is the 880 by 120 mm.

#### PLENTY OF FUEL IN FRANCE

Paris, Dec. 6—Stocks of gasoline and kerosene in France are adequate at the present time, according to an official statement issued by the Gasoline Commission. Present stocks consist of 120,000 tons of kerosene, equal to four months' average consumption; 100,000 tons of gasoline, and 60,000 tons of heavy mineral oils. If there is a shortage in certain districts this is due to poor distribution. Where the railroad service is not satisfactory, arrangements are being made for tank distribution by automobile. The ports in which stocks are maintained are Havre, Rouen, Dunkirk, La Pallice, Bordeaux, Balarue, Cette and Marseille.

#### SWEDEN LIKES AMERICAN TRACTOR

Washington, Dec. 8—Of American agricultural machinery, the American tractor seems to have the largest field in Sweden at present, according to a report received by the Department of Commerce. The demand is great and Sweden's four factories, with an estimated output of 400, are entirely unable to meet the situation. These factories also turn out motor plows, grain threshers and portable steam engines. The 25 hp. type

with pulling capacity of from two to four plows is preferred.

A large American agricultural implement house maintains an assembling plant in the country and make repairs. The tractors imported have come chiefly from America and England, but the demand is far greater than the supply, and bearing in mind the high price of grain, the lack of horses, and the great prosperity of the Swedish farmer, Sweden offers a lucrative market to the American manufacturer of tractors.

#### MAY BRIDGE NIAGARA RIVER AT BUFFALO

Buffalo, Dec. 8—Through automobile traffic between Detroit, Western Ontario and the United States at last seems destined to avoid slow ferry service or long detours in order to reach the American side of the border from Canada.

Bills have been introduced into both houses of Congress calling for federal inquiry into the practicability of constructing a bridge across the Niagara river at Buffalo. Creation of a bridge commission is called for, also hearings on the matter. Interest in the project is great along both sides of the border and belief prevails in Buffalo and elsewhere that the bridge will at last be built. Help of the Canadian government in the project has been practically pledged.

Heretofore motorists have been compelled to take the 60-mile detour to cross the river at Niagara Falls or have had to use ferry service in Buffalo.

## Tells of Ford Trouble

### W. C. Anderson Says Controversy in England is Now Adjusted

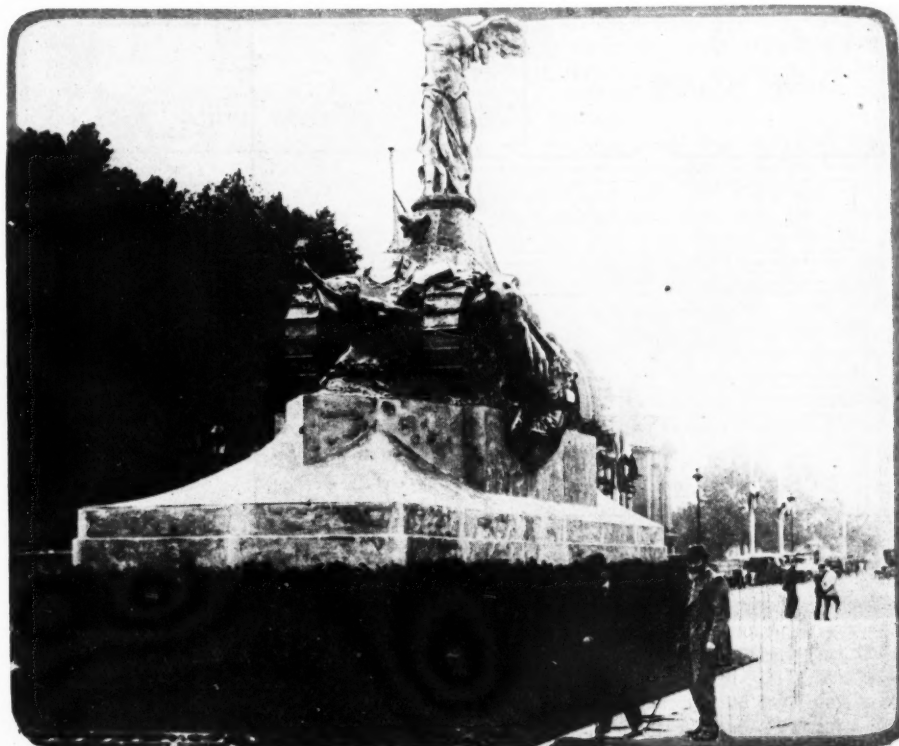
#### Dealers Put on Same Basis as Those in the United States

DETROIT, Dec. 6—W. C. Anderson, Ford Motor Co.'s British representative, who came to Detroit to give his side of the story of the controversy with Ford dealers in the United Kingdom, declared on the eve of his return this week that the troubles had all been ironed out and representatives of the dealers had returned to England thoroughly satisfied. The agreement reached was identical with that offered by him before the mass-meeting at which Roland Winn and E. F. Easton were designated to come to America to present the dealers' side to Ford officials. Winn and Easton spent several days in conference with officials at the Ford plant and in departing expressed themselves as satisfied with the explanations offered.

#### Dealers Are Well Pleased

"The result has been that we have built up a selling organization among the retail dealers such as they never had before," said Anderson, "and the dealers are tickled to death. It was natural there should be some complaint from distributors who in the past had controlled a string of dealers in their territory.

## Paris Commemorates the Tank



Paris has paid a fitting tribute to the Allies' chief invention of the Great War by erecting a statue to the Tank in front of the Grand Palais

# Exorbitant Rents Result in New Motor Row

How B. W. Rubin of Portland, Ore., was forced to Change the Automobile Map of His City

RECENT legislation in Oregon was so drastic that nearly 75 per cent of the garage and automobile men were to be left without a place of business. The new city ordinances were such that no automobiles, trucks, or other vehicles using gas or distillate, could be stored, kept or repaired in a building of frame, or having wooden floors, or used for living purposes. This started a scramble for new locations, complying with this law.

## Building Costs Are High

The cost of building, material, labor and taxes, was of course a matter of grave importance, with the result that for every available location, for every building suitable, or that could be placed in shape by remodeling, there were a dozen tenants, rents having soared to such tremendous height that to secure proper and suitable quarters became a problem.

After three months, four real estate men, making a specialty of leases, gave up in despair, but we were not discour-

By B. W. RUBIN,  
(President Rubin Motor Car Co., Inc., Portland,  
Oregon)

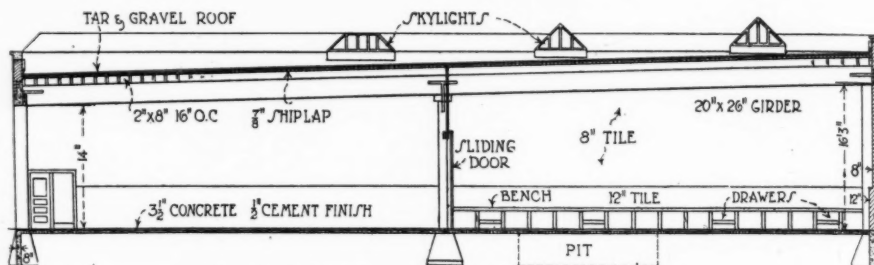
aged, rather on the contrary it spurred us on, more determined than ever to get what we wanted.

## High Rents Are Asked

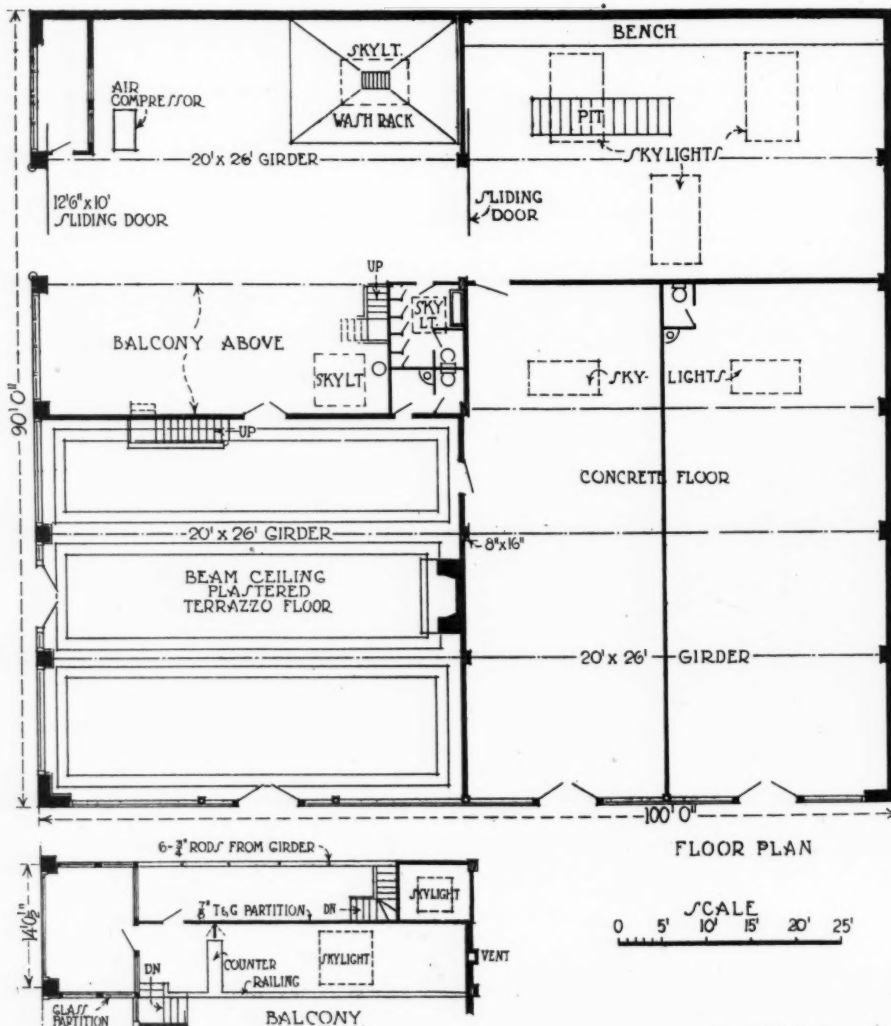
It finally came to a point where we were about to close a 50 by 100 ft. lot with a \$7,500 one-story building, for a rental of \$325 per month for two

years, and \$350 per month for the three succeeding years, the term of the lease. It was a location far from desirable and inadequate for our needs, and the only thing that stood in the way of our closing was the fact that an increased rental was asked after we had decided to take this building.

They sometimes say, "He who hesitates is lost." We must disagree with the person who first said so, because in our hesitating, we won.



Cross-section view of Mr. Rubin's salesrooms



Floor plan of Mr. Rubin's plant

First: We decided to get into a district not held by landlords expecting their tenants to pay for their buildings in one year's rent.

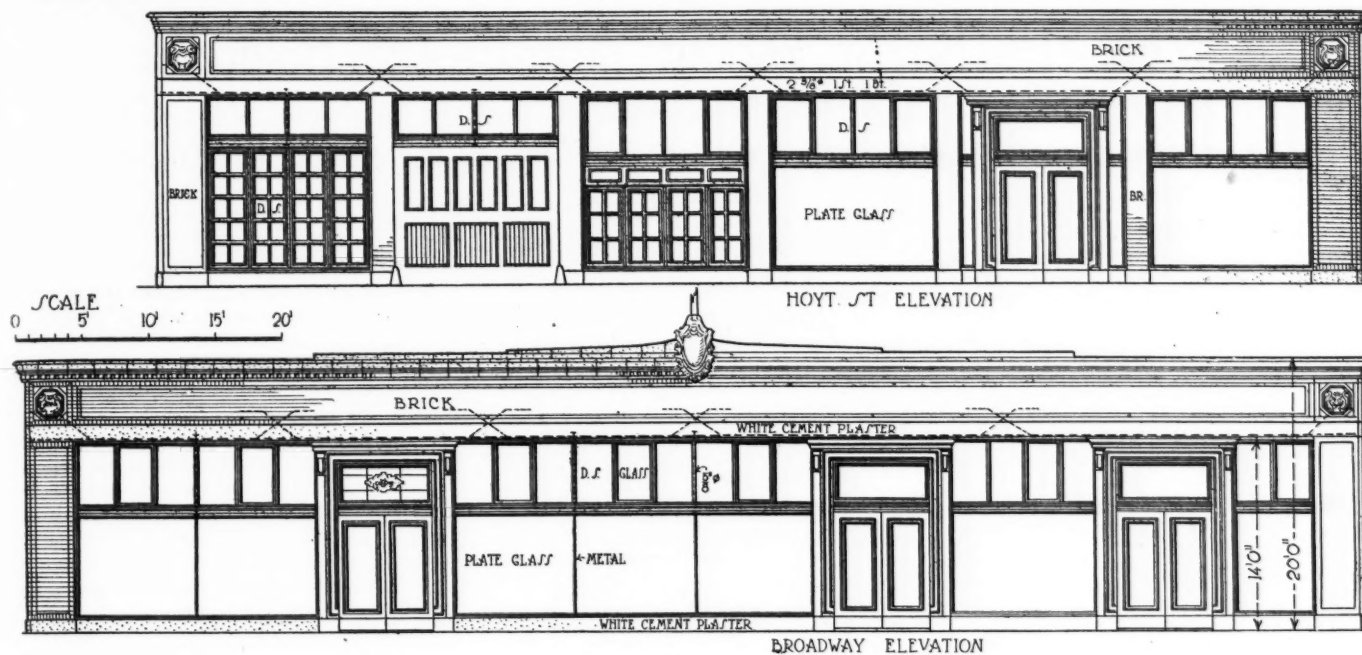
Second: We started a traffic check on street corners we considered desirable, and after five days of checking in comparison with the most prominent automobile row, we located a lot 100 by 100, containing an old, ill-smelling, dilapidated barn, as well as an eye-sore to all that passed.

## Many Cars Pass Site

The number of vehicles passing this corner, in comparison with the most prominent on automobile row, was 4 to 1 in favor of the old barn. This corner, on Broadway and Hoyt streets, was the leading artery over the newest and best bridge to the east side, a section of the city where 70 per cent of the city inhabitants dwell, as well as the main road to several of the largest suburban towns, and the main highways and byways to and from Portland.

Very little trouble was encountered in making arrangements most satisfactory to the owner and ourselves, and this is the result.

We to pay six per cent per annum on a ground valuation of \$60,000, or \$3,600; and eight per cent on whatever the cost of the building, which will not exceed \$25,000, or \$2,000 plus taxes and insurance, which amounts to \$1,800 per year, based upon a maximum of what next year's taxes may be, making a total rental to us of \$7,400 per year, or approximately \$600 per month. The property will not be taxed by the city until March, 1920; taxes not payable until first half of February, 1921, second half September, 1921, making



Front and side elevations of Ruben Motor Car Co. salesrooms

our rental \$450 the first year, when we want to keep our overhead down to the lowest point. In the arranging of our building, two stores in addition to that part of the building which we are to use, 25 by 60 ft. each, are leased at \$175 per month; the roof of the building for an electric sign for \$100 per month bringing our net rent down to nothing until February, 1921, when it will be \$75 per month until September, 1921, when it will be \$150 per month.

Since starting our building every

shack and vacant lot and old building in the neighborhood has been leased or sold, and the greatest building activity is now taking place at and around this point. Some of the largest automobile and accessory dealers are coming on this street, and it is now heralded as "automobile row," with our location as the best of them all. A number of bonafide offers to release has been offered, netting us from \$300 to \$500 per month.

Our salesroom on the corner is 50 by 50 ft., without a post, 20-ft. ceiling, mez-

zanine floor for offices and parts, terranza floor, massive fireplace, beamed ceiling, service room 50 by 50 ft. and shop 40 by 50 ft., with 150 ft. of plate glass front, together with art glass door transoms costing over \$1,700. Every modern and necessary convenience has been incorporated into this building, making it the very finest and most attractive of its kind and for its purpose; 2500 sq. ft. of salesroom, and 4500 sq. ft. of shop and service room. This is ample for our needs for several years.

## A Midget Motor Car



**W**HAT is said to be the smallest four-cylinder two-passenger automobile is the vehicle shown in the accompanying cut which was built by the Oldsmobile Co. of Hartford Conn. This midget, which is capable of a speed of

50 miles an hour, is fitted with 20 by 4 in. airplane tires and is employed chiefly for its value as an advertising asset, for surely when it appears on the streets everybody looks it over closely, and in doing so gathers the information that

the Oldsmobile Co. of Hartford handles the Oldsmobile passenger cars and trucks and Armleder trucks. The four-cylinder engine is air-cooled with cylinders rebored to  $2\frac{1}{4}$  inches. The stroke is  $2\frac{3}{4}$  inches. The tread is 34 inches and the wheel-base 86 inches.

Nels Nelson, an aviator, who is connected with the firm, designed and built the machine. It was originally intended to manufacture the cars in quantities but this idea was set aside for the time being. Some idea of the size of the car may be had from comparison with the man standing beside the hood. Aaron G. Cohen, head of the Oldsmobile Co. of Hartford, is seated at the wheel. Cohen was out in the car recently and his speed was such as to cause the state motorcycle policemen to give him a little attention.

### CEDAR RAPIDS SETS SHOW DATES

Cedar Rapids, Iowa, Dec. 6—Feb. 9 to 14 has been set for the annual automobile show to be conducted by the Linn County Motor Trades Bureau, the successor of the Cedar Rapids Automobile Trade association. The following officers of the new association were elected at the last meeting: W. J. Hutchings, president; John H. Newman, vice president; H. M. Daviess, secretary; H. D. Miller, treasurer; P. C. Rude, J. F. Hurto and Marvin Wright, directors.

# What To Know About Anti-Freeze Solutions

## Chance For Dealers to Put Customers' Radiators in Shape For Cold Temperatures—Car Owners Often Careless in Preparing Mixtures

MUCH winter service work can be directed to preparing customers' cars with an anti-freeze solution, because experience has shown that most car owners are themselves not capable of doing this work satisfactorily. In the first place they do not repair a defective radiator, do not flush out the system properly, nor are they particular in the way they prepare their own solutions. The directions prepared by all makers of anti-freeze compounds frequently are hastily passed over and altogether things are pretty well messed up. So it clearly becomes a part of the dealer's winter business not only to sell his customers anti-freeze compounds, but prepare his water system and then fill it with the anti-freeze as he knows it should be done.

### Alcohol Evaporates Rapidly

If it were not for the evaporating qualities of denatured alcohol this liquid would probably be ideal anti-freeze substance for radiators. If glycerine did not cost so much, this would find ready use, at least in conjunction with alcohol; there are those who would like to use kerosene or some other form of oil, while certain kinds of salt solutions have things in their favor and also against them.

Kerosene, for instance, has a high boiling point, is inflammable, smells bad, destroys rubber and is not generally recommended.

Glycerine is expensive, though perhaps not so high now as a year ago, when the government needed all for manufacturing explosives. A higher percentage is required than of alcohol. It, too, is an enemy of the rubber hose.

Denatured alcohol is probably the most generally used of all the solutions and yet this has its drawback in that it easily evaporates and frequent testing of the condition of the solution is necessary to be sure it will do its work when necessary, as for instance the sudden appearance of a cold spell.

Wood alcohol is today little used as an anti-freezing element because of the presence of denatured alcohol, which is cheaper and which can be obtained readily. Wood alcohol in the presence of heat and oxygen has a tendency to form acid, which will in time corrode parts. Besides it boils at a lower temperature than denatured alcohol.

Calcium chloride has until the past few years been generally used to prevent freezing and that it is effective in this regard cannot be denied; yet it has its drawbacks in more than one way and unless a person knows how to prepare and use it, it should be forgotten, for it can and will cause trouble if its properties are not known and recognized.

Anti-freezing compounds have within the past year or so made their appearance

### Freezing Points of Anti-Freeze Mixtures

#### DENATURED ALCOHOL

Percentage in water	Freezing Point Fahr.
0 .....	-32
5 .....	30
10 .....	25
15 .....	20
20 .....	15
22 .....	10
25 .....	5
28 .....	0
31 .....	-5
34 .....	-10
37 .....	-15
40 .....	-20
43 .....	-25
47 .....	-30
50 .....	-35

#### HALF GLYCERINE, HALF ALCOHOL

Percentage in water	Freezing Point Fahr.
5 .....	28
10 .....	25
15 .....	20
20 .....	15
25 .....	8
30 .....	-5
33 .....	-15

#### COMMERCIAL CALCIUM CHLORIDE

Chloride to each gallon of water	Freezing Point Fahr.
1 pound .....	27
2 pounds .....	18
3 pounds .....	-15
3½ pounds .....	8
4 pounds .....	-17
5 pounds .....	-39

(For Cooling Water Capacities of Passenger Cars, see Motor Age Maintenance Data Sheet, issue of Nov. 6, 1919.)

on the market and much is claimed for them. That some of them have been used with success has been proved and generally where failure has seemed to result the cause has usually been traced to the user in not following the absolute directions of the manufacturer.

Oils have been resorted to to prevent freezing and clear kerosene is not uncommonly used exclusively in the radiator. But while kerosene has a lower freezing point and a higher boiling point than water the inflammability of the vapors sent out make it liable to cause a bad fire. The

high point of boiling easily can lead to serious overheating of the engine and before discovered something might be injured beyond repair, even to the melting of solder in the radiator.

Naturally the user of kerosene may expect to renew the rubber hose of his car at least a couple of times in a season and it should be made a practice to drain out the oil and clean the radiator with a washing soda solution at least two or three times in the winter. The hose can be protected to some extent by giving the inside portion a couple of coats of shellac and in addition a light gage coil spring ought to be placed inside to prevent the hose from collapsing and thus shutting off the flow of oil.

### Kerosene Not Advisable

Kerosene boils at 350 deg. Fahr., so it is easy to see an engine can become pretty hot before the driver might be aware of trouble brewing, if not of damage already done.

The high boiling point of kerosene would seem to preclude its use unless over short drives and where stopping is frequent, so that the engine would not have opportunity to become overheated. The trouble would come when a sudden change in weather approached. If the temperature should rise it is certain damage would ensue.

No dealer should think of using a combination of kerosene and water, for while an emulsion might be caused when the mixture is warm, the water would settle and freeze quite as readily as if no oil were present. It undoubtedly is true that if kerosene is to be used it should be with the mixture of light lubricating oil in the proportion of two-thirds kerosene and one-third light lubricating oil. On the other hand a thermo-siphon system would not in all probability handle such a mixture; it would require the aid of a good pump to circulate the heavy oil.

Probably pure glycerine has automatically been eliminated from consideration because of its cost and yet if used with denatured alcohol it could probably save the user a little money and some anxiety in the course of a winter where a car is being used constantly. Glycerine will destroy rubber and this part of the car will bear watching if any of this element is used, whether alone or in connection with alcohol. Glycerine has a high boiling point and is, in consequence, a better solution for both warm and cold days.

Denatured alcohol will continue to hold its own as an element to guard against freezing of the water system, whether used alone or in connection with glycerine. It is somewhat expensive because of its capability of evaporating, but it is not dangerous and will not do harm to metals, although it will destroy paint

readily and should be handled with care when being poured into the radiator.

Denatured alcohol freezes at 160 deg. below zero, so it will be seen it is an effective anti-freezing element if proper proportions are used and if the alcoholic content is watched by using a hydrometer or freezometer, which will tell the exact temperature at which the liquid will freeze.

In using a hydrometer to test anti-freeze mixtures it will be found that if placed in water at 60 deg. Fahr. it will read 1.000 and at the same temperature if immersed in 180 deg. proof alcohol the reading will be 0.834. The denatured alcohol generally sold will be found to be 180 deg. proof, the minimum permitted by law.

Use of the hydrometer should be when the solution is at a temperature between 55 and 65 deg. Fahr., as the gravities given in the table are obtained at a temperature of 60 deg.

If a solution is made of 20 per cent alcohol and 80 per cent water and brought to a temperature of 60 deg. the hydrometer reading should be 0.978; if higher more should be added and constantly stirred until 0.978 is recorded.

There is much to be said for and against such salt solutions as calcium chloride, sodium chloride, etc. They may

cause two corrosive actions—chemical and electrolytic. Calcium chloride is apt to contain hydrochloric acid, which, if not neutralized, will attack all metals and directions for its preparation include a warning to test for acidity and to neutralize by the addition of an alkali before using. It is, however, a well known fact that a caustic solution is just as destructive as an acid forming, the hydrates of the different metals constituting the circulating system. Chemical action, although serious, is probably secondary in its destructive effect, to electrolysis. The latter action is apt to occur where salt solutions are used and cause eating away of the parts.

Calcium chloride exerts a greater corrosive action than water on the engine jackets, on the solder in the radiator and on the aluminum where used in manifolds and pumps. There may be little danger of hurting the water jackets inasmuch as they are of sufficient strength to withstand action, but the complete removal of solder from brass is possible when immersed in a hot 20 per cent calcium chloride solution for four days.

Calcium chloride solution will corrode aluminum rapidly, the effect depending upon the nature of the aluminum. Blisters will appear on ordinary sheet aluminum and, as these break, the metal separates

into scales or plates of corroded aluminum, which open. Cast aluminum shows a pitting. Calcium chloride is objectionable also when some of it happens to come in contact with the cylinder in that it will hold moisture and the fan action is apt to cause it to be transferred to the plugs and cause a short circuit. Again under certain conditions crystals may form in the radiator and cause a stoppage of the circulation of water.

But calcium chloride is not dangerous so far as inflammability is concerned. It will not readily evaporate. One charge will generally serve through a winter and it is cheap. As an emergency agent it might be used, for it will serve its purpose, but it never should be used without being neutralized and inasmuch as this involves some thought and work it may better be left alone.

The makers of anti-freezing compounds have taken the matter in hand and have produced compounds that are effective and generally reliable if the directions are followed. It is not pretended to say what elements are used in these compounds, but it is natural to assume that they would not be put out without careful chemical considerations and the removal of any element that could be found to be detrimental to any parts of the radiator or engine.

## Service Should Mean Maintenance

BY E. A. HASKINS

(Service Manager, Federal Motor Truck Co.)

SERVICE can be relieved of its mystery if given the common sense interpretation of maintenance. If every seller of merchandise would only have vision enough to realize the value of proper maintenance this subject would need no discussion. Under existing conditions, however, the future sales value resulting from business-like effort to keep equipment in operation has been subservient to the idea of production, immediate sales and immediate profit.

Some seem to have considered the maintenance problem a burden or necessary evil rather than one of the important divisions essential to the continued popularity and sale of their product. Others have surrounded it with a veil of mystery, intimating that there is only one place to secure parts and only one way in which parts can be made to perform satisfactorily the function intended.

There are two ways of visualizing the inter-dependence of factory and dealer. First, consider each as a link in a chain, starting with the parts maker as the ring end through the vehicle maker, distributor, dealer to owner, we find the owner dependent for satisfaction upon the parts maker. He does not necessarily appreciate this fact and if dealer, distributor and vehicle manufacturer, especially the latter, are measuring up to their responsibility, the owner will never need to have this forced to his

*In this article, Mr. Haskins lays stress upon the inter-dependence of owner dealer, distributor and factory. This was the motif of his speech delivered before the N. A. C. C. Service Managers' Convention recently at Detroit.*

attention. Likewise, the dealer, distributor and finally the vehicle maker are hampered or helped by the parts maker's maintenance facilities.

If the distributor is worthy of the name let him be the headquarters for parts and repairs in his territory. If the party nearest the owner is honestly trying to give service, justify his efforts; do not interfere with him. Do not let anyone get the impression that he can get any more by going over the dealer's head.

If the parts manufacturer's product is of a specialized nature demanding more care, knowledge or experience in its maintenance than can be expected of the vehicle manufacturer's dealers force, let the parts manufacturer establish his own

widespread repair system and work with the dealer in caring for such work. We can see no reason why the vehicle manufacturer should receive any remuneration in any fashion from such work which has been performed without his knowledge or assistance and without material in which he has his money invested.

The parts manufacturer should appreciate the necessity of keeping the vehicle manufacturer informed in advance of proposed changes in design, so we all may have an opportunity of preparing to care for these changes and not wait until such changes have been actually made.

As an ideal, in the parts service industry, we, therefore, have the owner cared for by the dealer who has a reasonable stock of most active repair parts and dependent upon the distributor for replenishment of his stock and for parts seldom used, as well as expert mechanical assistance and instruction. The distributor in turn depends upon the vehicle manufacturer for his supply of parts so that his efforts can be roughly checked. Failure of any one of these should permit the owner's request upon parts maker to receive prompt and immediate attention in such a way as other parties can be kept informed of their shortcomings so that proper action can be taken to prevent repetition.

# How one big service station gets out its invoices promptly and checks its work


HOW the Studebaker Sales Co. of Chicago services thirty cars a day and gets out the customers' invoices on short notice through the simplicity of their service system which operates on a cash basis, is of considerable interest.

All of the records pertaining to an individual repair order are kept on five forms. One of the principle features of the system is the customer's order form which is virtually a service contract. Inasmuch as about 75 per cent of the business is done on a flat estimate basis, a form of this nature is highly desirable.

If a customer who brings his car into the service department does not know exactly what the trouble is, one of the inspectors is assigned to the job to make an examination and determine the nature of the trouble. The order is then written up on one of the customer's order forms, the work for the various shops being separated into groups. It is required that the customer sign the order authorizing the repairs.

The order is written up in a form something like the following. The estimate being separated for each of the shops.

Repair shop—Burn carbon and grind valves .....\$16.00

		<b>INVOICE</b> <b>STUDEBAKER SALES CO.</b> OF CHICAGO AUTOMOBILE ACCESSORIES MICHIGAN AVE. AND 21ST STREET CHICAGO, ILL.		NO. _____ FOUR NO. _____
		SOLD TO _____		TERMS _____
QUANTITY	ARTICLES	PRICE	EXTENSION	TOTAL

The invoice form is universal, being used for billing repair work and parts sales

Wood shop—Take rattle out of doors ..... 1.50  
 Paint shop—Install monogram..... 3.00  
 Tin shop—Repair trimming..... 3.00  
 Total estimate .....\$23.50

This is a flat estimate and the job will cost the customer the \$23.50 regardless of the cost to the service department.

After the customer's order blank is completed it is then passed over to the invoice clerk in the service office where a repair order form which is used in the various departments of the service department is made out. This is made out on extra thick paper, one copy for each department which has work to do on the car. There are also two additional copies, one of which is retained in the service office and the other one pasted on a cardboard sheet and then placed in an order carrier which has a celluloid front to protect it from dirt and accompanies the car until the work is entirely completed.

## Keep Work in Order

Copies of the order are then immediately distributed to the various departments so that they will be informed as to the nature of the work and be prepared to receive it.

All of the various repair departments of the service department use a standard form of time sheet such as shown. This is filled out by the mechanic, containing such data as name, the time of starting and finishing operations, customer's name and the job number under which the work is being done. A space is also provided for a short description of the nature of the work done. At the bottom of the time slip is provided a small space for the total number of hours that the time ticket represents and the salary rate of the mechanic working on the job. This data is filled in by the cost clerk in the service office. These time tickets are sent to the service office as rapidly as the jobs are completed.

When these time tickets arrive in the service office they are received by the filing clerk who immediately files them per job order number for the repair jobs then

## CUSTOMER'S ORDER

No. \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

Name \_\_\_\_\_ Phone \_\_\_\_\_

Address \_\_\_\_\_

License No. \_\_\_\_\_ When Promised \_\_\_\_\_

**STUDEBAKER SALES CO. of CHICAGO**  
**CHICAGO, ILL.**

Gentlemen:

You are hereby authorized to furnish material needed and to do the following work on my automobile, Model and Motor No. \_\_\_\_\_ for which I agree to pay cash upon delivery.

Order taken by \_\_\_\_\_

I agree that you shall not be liable for loss of property left in or upon above car unless removed, checked in your vault and receipt demanded and taken by me therefor

Approved \_\_\_\_\_

Signature \_\_\_\_\_

Form S-5 3M 6-23-19

This is the work and repair contract from which shop copies of order are made

CLOCK#	DEPARTMENT	MACHINE SHOP	DATE	JOB #	MACHINE SHOP	DATE	MODEL CAR	CUSTOMER'S NAME	JOB #
EMPLOYEE'S NAME				CUSTOMER'S NAME					
START		DESCRIPTION OF WORK DONE			QTY	PART #	DESCRIPTION	COST	SELLING
FINISHED									
EMPLOYEE'S SIGNATURE				HOURS	RATE	AMOUNT	CAR PROMISED		
							DELIVERED BY		
							FOREMAN		
							RECEIVED		

Two of the simple forms used in Studebaker system. On the right is the worker's time record and on the left the customer's invoice

in process. Each morning the cost clerk checks the job time tickets against the daily time card of the men to make sure that no time is lost and that every available bit of the time that the mechanic puts in at his salary rate is charged against some job number.

#### All Material Requisitioned

Material is requisitioned from the stock-room on the requisition form illustrated. This form is made out in duplicate; the duplicate copy of which is retained by the stock department as a matter of record. The original is priced as soon as the order is filled and then is sent to the service office where same is received by the filing clerk. This is filed by job number in the same manner as the time tickets. Both time tickets and material requisitions are kept flowing through constantly so that there will be no delay in billing the job when it is completed.

As soon as a car is completed by the shop and sent to the service department for final inspection, all time tickets and material requisitions have been received by the filing clerk and properly filed. As soon as the report is received from the inspector that the car is O. K. the job envelope and all time tickets and requisitions pertaining to it are removed from the process file and given to the cost clerk in the service office. The retail and wholesale cost on jobs are then figured up.

The filing envelope as shown in the illustration serves as a bookkeeping method for showing the wholesale and retail cost of a job. This envelope is made out at the same time that the thin tissue copies of the order are made up before the car is sent up to the machine shop for repair. This envelope is then placed in the process file in numerical order. This is to have everything in readiness for filing of the time tickets and material requisitions as they come through after they have been properly approved.

As soon as the cost clerk has made the cost entries on the outside of the repair order envelope it is then passed over to the invoice clerk who makes out an invoice from the data furnished by the cost clerk.

Inasmuch as the time ticket only shows the actual cost of labor and does not include the hourly overhead charge, this is added by the cost clerk in the service office when the wholesale and retail cost of the job are figured up.

After the invoice has been made up in duplicate and the job paid for, the duplicate copy of the invoice is properly marked indicating that the job has been paid for and the invoice enclosed in the envelope. The envelope and all its contents are then forwarded to the accounting department which then posts the two costs shown on the outside of the envelope and returns the envelope and its contents to the service department so that it may be filed as a matter of record.

To assist the routing of cars to the various departments which are scheduled, the company employs what is known as a layout man. His duties are to prepare the way for and to follow a car through all departments and see that it is delivered to the service department at the time promised.

#### Employ Routing Man

The service manager receives three times a day reports from the layout man showing the exact status of each car in the service department. By closely following jobs in this manner the layout man is able to tell the service manager two hours in advance whether jobs promised will be ready for delivery as scheduled.

3-9-3M 12-15-18

NAME \_\_\_\_\_  
 ADDRESS \_\_\_\_\_  
 CAR \_\_\_\_\_  
 DATE \_\_\_\_\_

#### DETAILS OF ORDER

JOB No. \_\_\_\_\_

CHARGE	DEPT.	HRS	LABOR		PARTS		SUPPLIES	
			SELLING	COST	SELLING	COST	SELLING	COST
	W							
	S							
	P							
	T							
	F							
	E							
	M							
SELLING								
COST								
LABOR								
PARTS								
SUPPLIES								
TOTAL								

JOB No.

All cost data and distribution is posted on this form, which also acts as a filing envelope

# Getting the Ideal Tractor Salesman Is a Real Job

The Eighth of a Series

BY FRED M. LOOMIS  
(Motor Age Editorial Staff)

"THERE ain't no such animal" as a general rule, method or plan for selling a tractor. During the last year or so the writer has seen hundreds of tractor dealers scattered pretty well over all parts of the United States and in no two cases have the methods been just the same. Every man's method is just as individualistic as is his own nose and it belongs to him just about as closely. For one dealer to adopt slavishly the method of another man would result almost as disastrously as to graft the other man's nose on his face. When it comes to selling tractors every man has to work out his own salvation as best he can.

However this may be, there are, nevertheless, certain fundamentals which every dealer must observe more or less closely. These will be essentially alike in every case. It is upon them as a foundation that the dealer will build his own peculiar plan and which as a finished structure of salesmanship will reveal his personality in its architecture.

## Three Fundamentals Required

These fundamentals will have to do primarily with three things:

### Departmentization Demonstration Service

The reduction of the fundamentals of tractor selling to these three heads is a conclusion based upon an examination of the selling methods of a large number of dealers who have made a success in the tractor business. In every case, whatever else the dealer did to achieve success, these three, in some form or other, were present. So ubiquitous are they that it is impossible to escape the conclusion that the dealer who would sell tractors successfully must rely upon them fundamentally. There are other things that are of great importance likewise, of course, such as a consistent method of advertising, a coherent plan for securing prospects and following them up, methods of operative education and similar activities, but these all admit of endless variations. It is not necessary that any common plan for any one of these last named factors be employed. The dealer may approach them from a hundred angles and he may employ as many methods in getting them across. But unless he departmentizes, demonstrates and gives service, success in the tractor business is all but impossible.

Departmentization is, however, an elastic term. There may be real, actual departmentization, or there may be partial departmentization down to mere specialization. But in effect it is depart-

*The writer of this series of articles, Fred M. Loomis, is particularly well equipped to render excellent advice to readers of Motor Age who are now, or who contemplate a little later entering, the tractor business, as dealers, distributors or repair and service men.*

*Mr. Loomis has had nearly 30 years' experience in the tractor and farm vehicle line, both as dealer and as a writer on agricultural subjects.*

*This is the eighth of a series of articles by this writer. In previous articles he has touched upon some of the more important phases of the tractor business. In future articles, Mr. Loomis will go thoroughly into problems which are constantly confronting tractor men.*

mentization and in all its degrees it is fundamentally important.

These articles will be read very largely by, and they are intended very largely for, the motor car or automotive dealer who has undertaken the selling of tractors. These men consist principally of two classes. The one is the motor car dealer who never has had any experience with farm operative equipment and who has added tractors and power farm equipment to his motor car line. The other is the man who originally was an implement dealer, but who subsequently added motor cars and now has taken on tractors.

## Departmentization Is Important

Departmentization means something different to these two classes and is gone about differently by each. Real departmentization, that is, the complete divorce of the tractor and farm equipment business from the motor car end of the business, is peculiarly important for the first class, the class which has been exclusively automotive and which now has taken on the tractor.

It has happened very commonly that the very first thing the motor car-tractor dealer has discovered is that his motor car sales organization is not very effective when diverted to the selling of tractors. The tractor cannot ordinarily be sold as the motor car is sold and the man who is trained in the latter school alone finds it difficult or impossible to adjust himself to tractor selling conditions. Almost

never is he a success if he tries to combine the two, and even if he specializes on tractors, unless he possesses certain qualifications, is it easy for him to get the hang of it.

If he has the requisite qualifications for the tractor salesman, then he will find his experience as a salesman of motor cars an advantage rather than a handicap, but to make this experience an advantage it is necessary for him in a majority of cases to forget the motor car and to concentrate on the tractor. He then becomes a specialized automotive salesman. But he is employing a branch of knowledge in his tractor experience he hardly used at all when he was selling motor cars. But, having developed his ability as a salesman by selling motor cars, he supplements that ability with his other qualifications, which are a knowledge of farming and mechanical ability, and in the end he becomes a good tractor salesman.

## Must Select Salesman

When the motor car dealer recognizes the importance of thus differentiating between the motor car salesman and the man qualified to be a tractor salesman and puts the latter to work exclusively on tractors, he has taken the first step toward that departmentization of his sales organization which leads to success in selling tractors. Until he does recognize the importance of this, he has not taken even the first real step. A little farther on in this article there will be something said about the kind of men who make the best tractor salesmen, and what is said then may be considered in connection with the conclusion reached just now.

A little while ago it was said that departmentization must be real or partial. The degree of departmentization depends upon the conditions surrounding the individual dealer.

If the dealer happens to be located in a good sized town or small city, where it is necessary for him to have an elaborate organization anyway, it will be imperative for him to departmentize completely if he intends to sell tractors. Once in a long time the motor car salesman who has been selling motor cars principally to farmers manages to get across when he tackles tractors, but such a case is the very rare exception. Almost never can the motor car salesman who has devoted himself largely to city trade turn his attention to tractors and make good. It has been demonstrated almost universally that when the city motor car dealer takes on the tractor he cannot hope to succeed unless he effects a complete department-

ization and employs special tractor salesmen for the job.

As the town grows smaller and the organization of the business becomes smaller or more simple, the necessity for complete departmentization is not so absolute. It will happen in very many cases in the smaller towns that either the motor car dealer himself, or his salesmen, are men who have come from the farm, who understand farming conditions and can talk the farmer language. Thus either one or both will possess the necessary qualifications for a tractor salesman and it will be easier for them to adapt themselves to the requirements of tractor salesmanship than it is for the city chap. In cases such as this mere specification will take the place of complete departmentization.

But it must be evident that this is just a difference in degree and not a difference in kind. Whether the man becomes the salesman in a special department of a large business or specializes in a small business, nevertheless he is devoting himself primarily to one department of the business and thus becomes a specialist. And to insure success in the selling of tractors someone about the place must be the special tractor man.

#### Implement Men Usually Good

It must be evident, too, that as respects the second class of dealers mentioned, namely, the implement man who has become automotive and who now has taken on tractors, the need for complete departmentization is not so great, irrespective of whether he is in a large town or small. It almost always happens that he has salesmen who already are farm specialists through their connection with the implement end of his business and from these his tractor salesmen will be drawn. The man who has been selling implements, provided he has also the requisite mechanical ability, very readily adapts himself to the requirements of the tractor salesman without special preparation.

But in this case, as in the former, the more completely the man who sells tractors can divorce himself from all connection with the other departments of the business, the more likely is he to be a success. Irrespective of his previous training, he will find it advantageous to devote himself as exclusively as he can to selling tractors if he is to take the business as seriously as he ought. Too much emphasis cannot be laid upon this fact for both classes of dealers. It may be asserted as a fact that where success has come in the tractor business almost invariably it has come through departmentization or specialization. This means that the dealer, be he big or little, have he many men or just one, or even if he be all alone, would he succeed as a tractor dealer, will do well to make selling tractors a real business. Almost never is it worth a whoop when it is tried as a side line.

Under this heading of departmentization comes naturally the selection of the

man who will be used as tractor salesman. As regards this chap the most common complaint is that he is hard to find. The necessary qualifications for a successful tractor salesman are well enough known, but to find the man who combines them all is another matter. Dealer after dealer whom the writer has seen and interviewed say that this is their hardest problem. They know fairly well the kind of tractor they ought to sell; they understand fairly well the conditions they will encounter in their territories, but to find the man who can take conditions as they are and go out and fit the tractor to them is the hardest job.

It is not altogether unlikely that more dealers have been more or less of a failure in the tractor business to date because of the lack of competent salesmen than for any other reason, unless it should be the disregard for the importance of real tractor service which so many dealers have manifested. Under any scheme of departmentization or specialization the salesman is an all important factor.

Probably this is a shortcoming which will be less ominous for the success of the tractor business as time goes on. Inevitably, as the tractor becomes a more and more important adjunct to modern farming, real salesmen will become more numerous. It is indeed certain they will become more numerous. There are men in almost every community who now are gaining experience and who are in the process of becoming acceptable and successful tractor salesmen and as time goes on there will be more and more of them.

#### Must Pay Salesman Good Salary

But this introduces a fact of importance which the dealer must not overlook. The tractor salesman is essentially a specialist. And specialists cost a good wage. Men who are competent as salesmen in the tractor field will cost the dealer more money than he has been in the habit of paying for salesmen in other lines. The motor car dealer will find for the most part that he will not be able to put tractor salesmen on a commission as he so often has been able to do in the motor car business. The tractor business is not far enough advanced for that, as yet, and the sales resistance still is too high. When it becomes as easy to sell a tractor as now it is to sell a motor car, and that time surely will come some time, then the tractor salesman will be willing to go out on a commission, or part commission basis. But until that time comes it will be necessary, in a vast majority of instances, to pay him a regular salary. As the tractor salesman must be a more competent man as a rule than is the ordinary canvasser or solicitor, it will be needful to pay him accordingly. This fact some dealers have not fully realized so far and this is one of the reasons why they have not made greater progress in the tractor business.

This is an evident fact because the man who sells tractors must combine

qualifications that are not usually found in combination now but which have to be acquired.

Let us take the word of some of the dealers who have been successful in the tractor business and who either have been lucky in hiring men or who have succeeded in training men.

One such dealer says the best man to hire to train or to put right out selling is the man who has been a farmer and who knows farm mechanics. The knowledge of farming is plain enough to understand, because selling a tractor is an appeal to the utilitarian side of the business and unless the salesman understands farming he will be unable to make much of an impression upon the farmer. It is not like selling the farmer a passenger car. The difference is so obvious that a mere allusion is all that is necessary here.

#### Mechanical Ability an Asset

Understanding farm mechanics is not quite so plain. Farm mechanics is not shop mechanics. There are not the same appliances on the farm there are in the shop and operations must be conducted with an ingenuity and with adaptations of common tools that are unknown in the shop. The salesman must know how to do all of these things in the farm way, because he will discover that one of the strongest of the resistances he will have to overcome in selling tractors is the fear of the farmer that with his limited mechanical knowledge and his limited mechanical equipment he will be unable to give the tractor the care and attention it ought to have and that he will be up against delays and expense for service and repairs if he buys one. The salesman must be in a position to assure the farmer that what he will find needful to do in a majority of cases will be only what he himself will be able to do with what he has in the way of mechanical knowledge and farm tools.

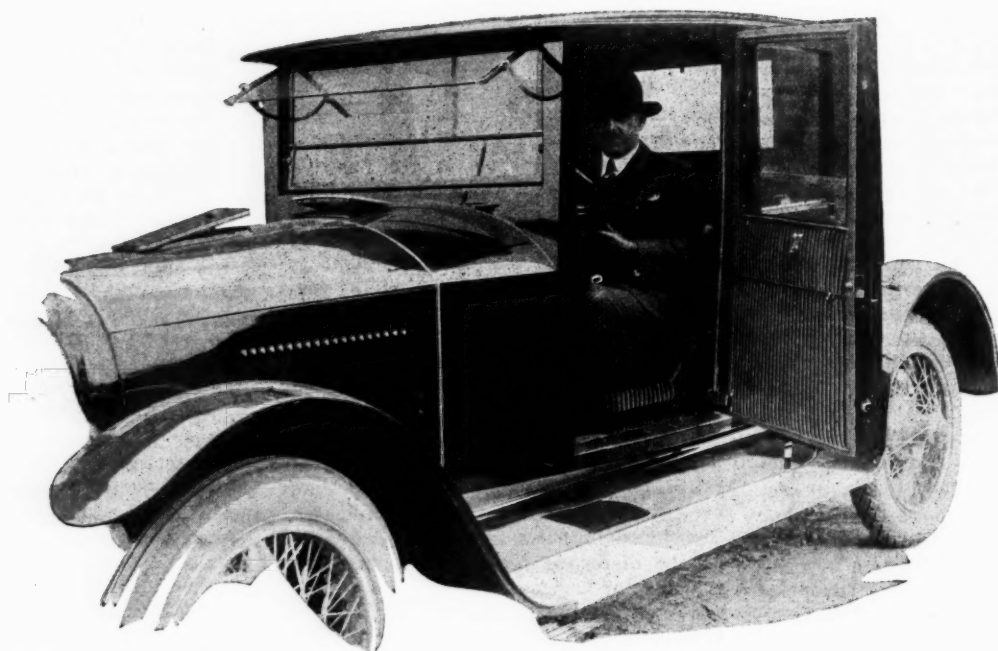
Another successful dealer says the ideal salesman is the man who has had experience in the operation of tractors and who at the same time is a good mechanic.

This combination of qualifications does not depart so far from the variety just considered as to warrant any special comment. The mechanical ability is a common factor in both varieties, while the past experience gained through the operation of tractors naturally will have given the salesmen the requisite insight into farm methods and needs.

A third dealer says the ideal salesman from his point of view is the man who has a thorough knowledge of farming conditions and methods and who has mechanical ability and experience. Probably everyone will agree that this is a definition of the ideal tractor salesman. There are not many of them. Only here and there is such a paragon of salesman virtue discoverable. Happy is the dealer who finds one.

But, and this is worth thinking about,

(Continued on page 29)



Interior view of Kissel coupe

## Kissel Has New Coupe Body

### Standard Chassis Is Retained With Same Six-Cylinder Engine and Wheelbase

THE new Kissel custom built coupe is a direct combination of the standard Kissel chassis, having a wheelbase of 124 in. powered with a six-cylinder engine, bore and stroke of 3.5-16 by 5½ in. and a special Silver designed coupe body. The car considered from the standpoint of attention to detail from the hands of the designer is most complete and with the square appearance of the low seated body a very fast looking job is offered.

#### Built on Standard Chassis

The chassis, which is standard for all Kissel models this year, has a Kissel engine of the moderate speed type. At 2300 r.p.m. it develops 61 h.p. L-head construction with a removable head is retained in this model. The crankshaft in the engine has three large bearings all 2¼ in. in diameter and measuring in length from the front to the rear 21-16 in., 2½ in., and 3 in. Connecting rod bearings are 2 in. in diameter and 1¾ in. long. All bearings are of "Fahrig" anti-friction metal, composed of 90 per cent tin and 10 per cent copper. The backs of the bearings are of perforated steel to give greater strength and add a toughness that prevents the bearings from being pounded to pieces should a loose bearing develop.

The upper half of the crankcase is cast iron and is cast integral with the cylinders. Oil is contained in the lower half of the crankcase which is a steel stamping having a contained sump trough for the connecting rods to dip into.

Camshaft, pump and accessory drive

shafts are gear driven. A steel gear which is part of the front end of the crankshaft engages with a Fabroil gear on the camshaft which in turn engages with a steel pump shaft gear. This arrangement is designed to eliminate the humming noises often incident to all-steel gear construction. The pump-shaft drives a centrifugal pump for circulation of the cooling water. Leakage on the pump is prevented by the installation of large packing glands, easily accessible should the need for tightening occur to prevent water leakage.

Engine lubrication is a combination of pressure and splash. A positive driven geared oil pump furnished oil under pressure to a bearing distributing lead which has take-offs to each bearing. A second main leads the oil to the reservoir at the front of the engine where the timing gears run in a constant bath. The surplus oil from the front bearings also supplies this reservoir. Kissel automatic oil control for which patents have been applied is used to supply the oil according to the load on the engine. At high speeds the oil supply is greatest and at the lower speeds the supply decreases in direct proportion to the engine speed.

#### Stromberg Carburetion

Carburetion is from a 1¼ in. Stromberg bolted directly to the cylinder casting. On this carburetor the auxiliary air valve is eliminated and all air passing through the carburetor is heated, thus helping out the problem of carbureting low grade fuel. In conjunction with

the heating of the air to assist carburetion, a thermostat is bolted directly to the water outlet at the top of the engine. It is the purpose of this to maintain an efficient engine temperature regardless of climatic temperature.

Power transmission is to a Warner multiple-dry disk clutch. A three-speed selective Warner transmission is also used. The rear is Kissel floating type with spiral bevel pinion and ring gear. Timken bearings are used throughout in the rear axle. Driving and braking torques are taken through the springs which is the regular Hotchkiss drive.

#### Body of Silver Design

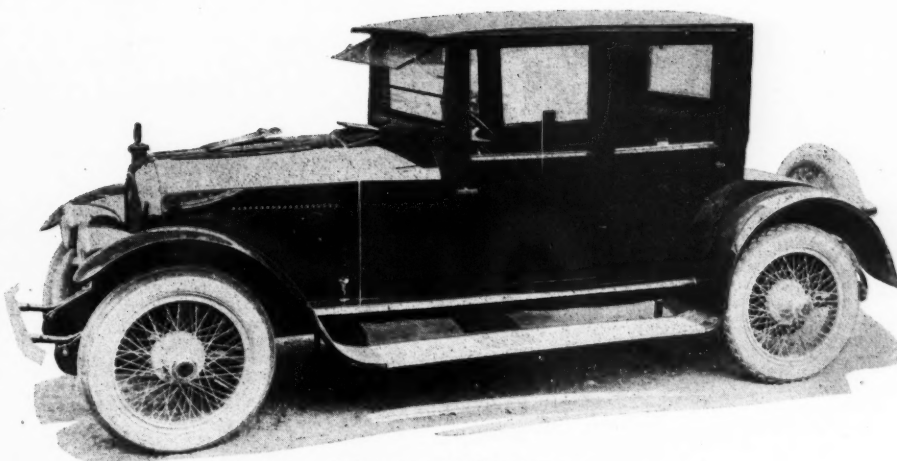
Remy furnishes the complete electric system, lighting, starting and ignition; and a Willard battery is used. The starting and lighting units are individual; that is, the system of the two unit type. The starting motor with a Bendix screw drive engages with the teeth on the fly-wheel.

The body for this special coupe job is of Silver design. Although the car is called a coupe model it seats four persons comfortably, the driver having an individual seat of his own with two persons seated slightly to the rear and to his right with the fourth person occupying the folding seat adjacent to the steering wheel and facing the rear. The rear seat is comfortably large for two people and should the occasion present itself a third could be seated there.

Appointment has been worked out to the nth degree. There are a great many

little contrivances which add to the comforts of the driver and the passengers. The ventilator, for instance, mounted on the cowl is controlled from a small handle on the dash furnishing ventilation should the inclemency of the weather prevent the windshield, door and window panels from being left open. A rain vision is standard equipment and this is controlled from the inside. Interior trimming is furnished in a variety of colors to match the purchaser's selection and also to harmonize with the colors chosen for the body.

Wire wheels of Distel wheels are optional but the motometer is standard equipment. Standard equipment also includes the equipment which has been furnished by the company in past years.



Side view of Kissel coupe

### THE IDEAL TRACTOR SALESMAN

(Continued from page 27)

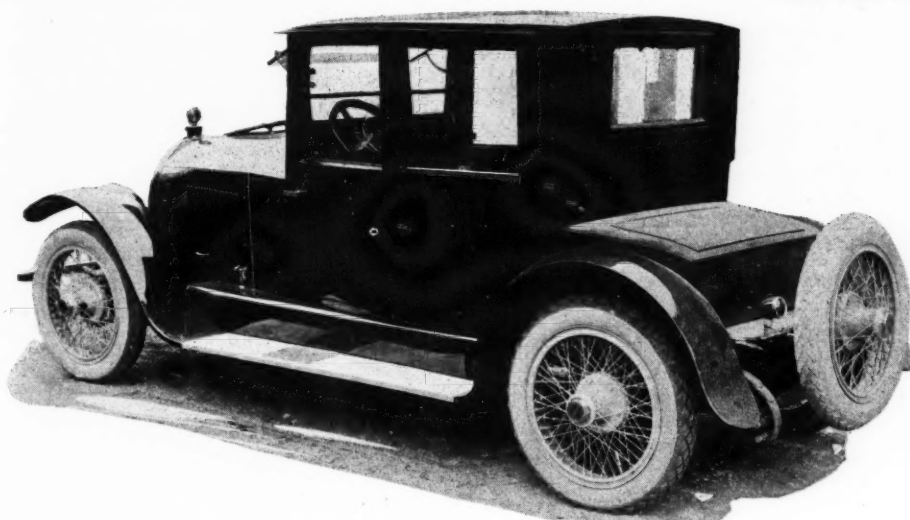
it is possible to make such men. Given the rudiments of the requirements necessary and it is easy in time to develop such men and many are developing today. Really there are more of them than one has any idea of until a dealer to dealer investigation is made. Such men, too, usually are found in the smaller towns. The very variety of the work they are called upon to do rounds them out in experience and gives them a more comprehensive knowledge of their functions than men get usually in larger communities or where the business with which they are connected is more specialized. The spectacular tractor salesman of the future will be largely men who have gained their experience in the smaller towns.

One dealer has adopted a novel plan as respects the salesmen he employs. His plan may be mentioned merely for its singularity, because it hardly will be feasible in a majority of instances.

This man works his salesmen in pairs. One should be, he says, "a real salesman"; the other an operator who has a knowledge of farm work and who has mechanical ability. It is easy to picture the team work this pair will do. While one is tooling the tractor around the field making it do its work acceptably, the other sits on the fence with the farmer and brings his salesmanship into play. Maybe the combination is a good one, but it is doubtful if many dealers could use the plan.

Much more might be said about this first of the fundamental things of tractor selling—departmentization. Here no effort has been made other than to touch some of the high spots and other features of the subject will be handled later. For instance, in subsequent articles of this series there will appear concrete instances of departmentization and specialization which will be adaptable to any tractor business large or small.

Also later articles will take up the other fundamentals mentioned, demonstration and service. Both are of such great importance that it is not possible to let them go by with a mere allusion to their importance.



A rear view of the new car

### New Truck for Tractor Service



Truck body for tractor service work

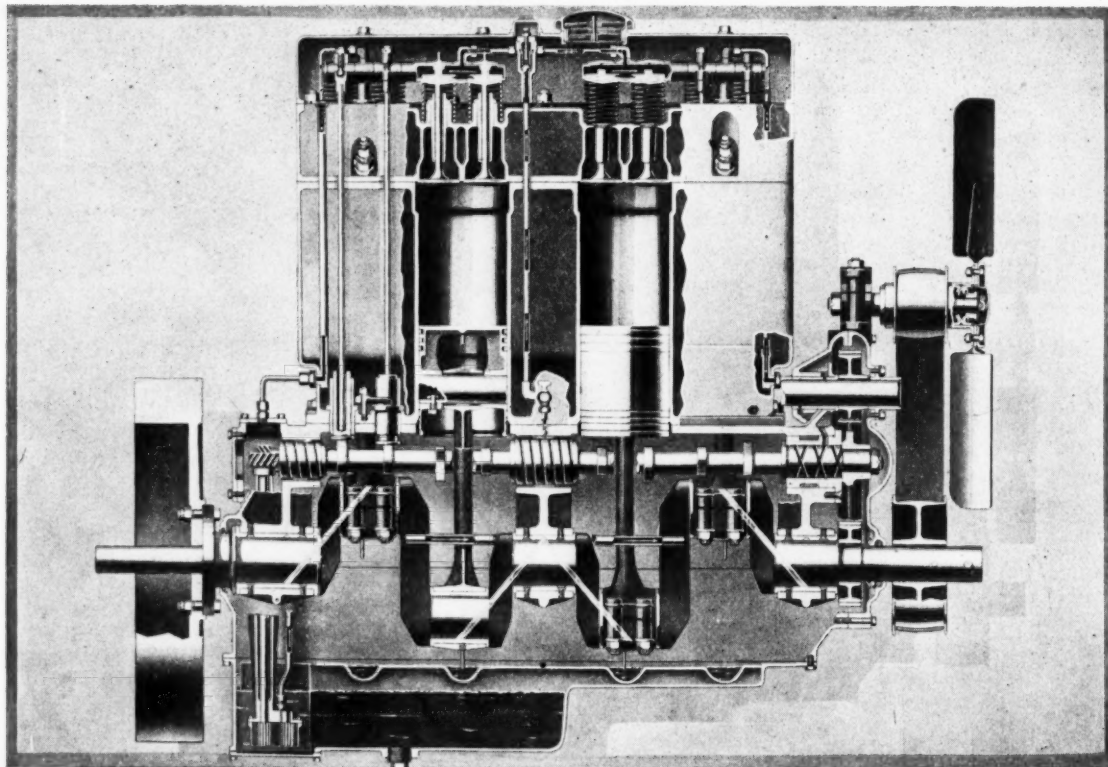
**O**CCASION sometimes demands that a tractor be brought into town for repairs, especially when overhauling work is to be done. With large tractors, obviously this becomes difficult, as such a machine is sometimes located so far out that driving it over the roads to town would be foolish. But with smaller tractors, like the Fordson, Samson, Cleveland, etc., dealers prefer to bring in the tractor to their shops, where it is possible to do overhaul work under much more favorable conditions.

To that end the Kastory Mfg. Co., La

Grange, Ill., is making a truck body for mounting on a Ford truck chassis and which is intended for service work on the Fordson tractor. This service truck has a body 108 in. long, 68 in. wide, with panels 14 in. high. There is a hand hoist in back of the cab, equipped with 25 ft. of cable to pull the tractor up runners that reach from the body to the ground. The floor, also, has tracks for the tractor to run on. For making repairs to the tractor in the field a folding work bench is fitted. The cab has a built-in windshield and curtains.

# Erd Has New Series of Heavy Duty Engines

Overhead Valves, Removable Head and Pressure Oil System Chief Features of Latest Design



Sectional view of Erd engine

**T**OP valves with a removable head, a bore and stroke of  $4\frac{1}{2}$  by 6 in. and a pressure system for oil distribution; these form the outstanding features of the new Erd heavy duty truck and tractor engine. Of special interest from the service man's viewpoint is the accessibility which is worked out to a time saving degree as far as the repair man is concerned. The engine weighs about 1100 lb. and develops 58 hp. at the peak revolutions of 1300 per min. This is a development of about 1 hp. per 19 lb. of weight not a surprising figure, but which is made necessary because of the rather heavy construction.

Four sections form the whole engine. First, is the bottom half of the crank case, containing the oil reservoir and the sumps for the spoons of the connecting rods to dip into. Second, is the upper half of the crankcase holding the bearings for the crankshaft, the camshaft and the oil pump. Third is the engine block, having the four cylinders in unit. Fourth is the removable head containing the valves, rocker arms, etc.

The crankshaft of the engine is a drop-forging having three bearings and is drilled for the oil distribution. The bearing sizes from the front to the rear are respectively,  $2\frac{1}{2}$  by  $3\frac{1}{2}$  in.,  $2\frac{1}{2}$  by  $3\frac{1}{2}$  in.,  $2\frac{1}{2}$  by  $4\frac{1}{2}$  in. Connect-

## ERD ENGINE SPECIFICATIONS

*Cylinders*—Four, valve-in-head, cast in block,  $4\frac{1}{2}$  or  $4\frac{3}{4}$  by 6 in.

*Weight*—1100 lb.

*Ignition*—Any standard type of magneto or ignition system.

*Carburetor*— $1\frac{1}{4}$  in.

*Lubrication*—Gear pump, force feed and splash system.

*Cooling*—Centrifugal water pump.

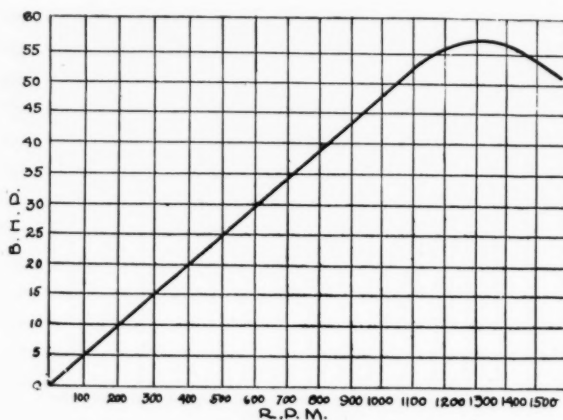
*Piston displacement in cu. in.*,  $4\frac{1}{2}$ -in., 381.7 cu. in.;  $4\frac{3}{4}$ -in., 425.3 cu. in.

ing rod bearings measure  $2\frac{3}{4}$  by  $3\frac{1}{4}$  in. A rod to crank throw ratio of 4.1 is obtained with a rod length of  $12\frac{1}{4}$  in.

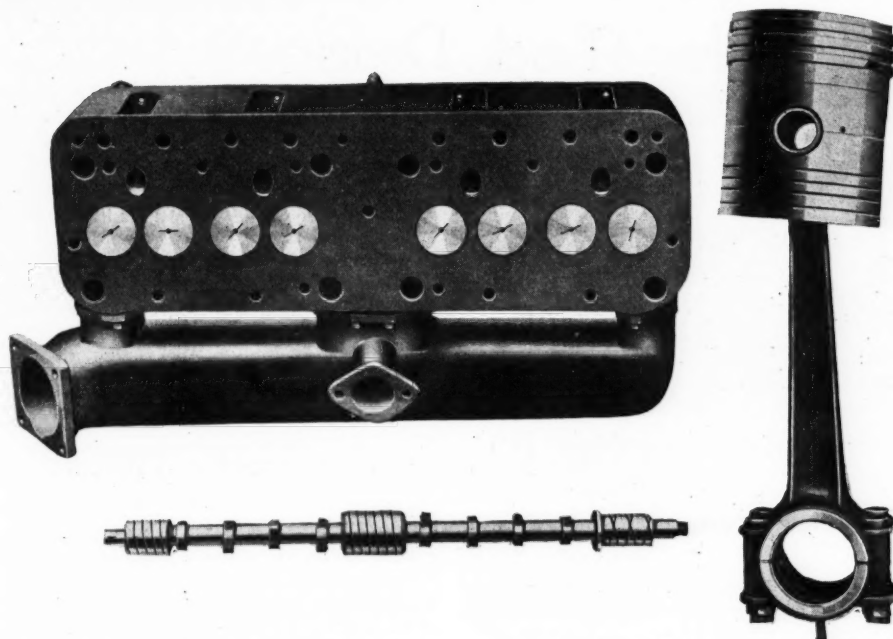
Camshaft drive is through gears at the front of the engine. The camshaft has large bearings; these are lubricated by means of oil grooves which are plainly shown in the illustration.

Lubrication by means of the gear pump is thorough; an oil lead from the pump feeds the oil to the center bearing of the engine. An annular oil groove feeds the oil to the drilled shaft and from here it is led to the lower connecting rod bearings for each of the middle cylinders. This oil lead also furnishes oil to the front and rear main bearings where it is distributed through annual oil grooves again, through the drilled rod to the connecting rod to the connecting rod bearings to the first and fourth cylinders. The oil as it forces its way outward from the bearings collects in the splash troughs where the spoons from the rods pick it up and splash it to the camshaft tappets. This splash system is not relied upon to lubricate the bearings of the camshaft, these being oiled by the supply from the pressure leads.

The lead to the center camshaft bearing is large, much larger, in fact, than is necessary to supply this bearing, and it is this excess



Power curve of Erd engine



Upper left, the detachable head of the Erd engine showing the large valves. To the right the piston and rod with the oil grooves for the prevention of over lubrication.

Also the camshaft with its large bearings, and the oil grooves for lubrication

oil that is piped to the distributing lead at the top of the engine from which it is led to each of the two sections of the hollow rocker arm. The oil passes through these hollow sections and then is drained to the lower part of the engine by means of special leads. The oil from the forward section of the rocker arm passes down to the accessory drive shaft and gears where it finally drains to the oil reservoir at the back of the engine. The oil from the after section of the rocker arm passes down its lead where it lubricates the helical gears driving the oil pump.

To insure that this oiling system will not over-lubricate the engine by the collection of oil in the combustion chamber,

three rings are fitted to the piston above the piston pin and four oil grooves are cut in the skirt.

The exhaust and intake manifolding is worked out conjunctively. Intake gases are lead into the cast in section of the exhaust manifold where they are thoroughly heated. A 1½-in. top outlet carbureter is used. Effective diameters of intake and exhaust valves are 2½ in.

Cooling is by means of a centrifugal pump at the right side of the engine, operating in conjunction with the fan driven with a 2-in. belt from the crankshaft.

A study of the illustration shows a few of the accessibility features of the en-

gine. The accessories for instance are easily accessible. The oil pump is at the lower right-hand side of the engine to the rear and can be inspected by removing the four small screws holding the lower cap in position. This construction makes it unnecessary to remove the bottom pan to inspect the oil pump. The timing gears can be exposed and removed by taking off the front half of the housing; this can be done without removing the radiator of the truck or tractor, nor is it necessary to remove the fan or its driving parts in order to remove this housing. One drain at the intake side of the water pump drains the whole water cooling system. Fan adjustments can be made very easily by means of an eccentric mounting. Engine suspension is either three or four points whichever the manufacturer decides upon.

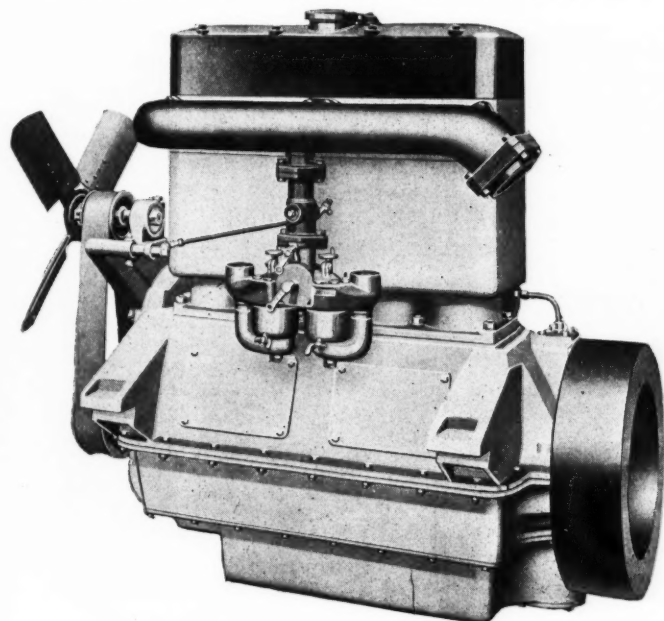
#### ASK FOR TRACTOR SERVICE SCHOOL

Chicago, Dec. 7—Tractor enthusiasts of Plains, Kansas, didn't know whether they were on the Avery Co. schedule of Service Schools or not. In order to be sure that they were going to have one they made up a petition to the Avery Company, Wichita, Kansas, as follows:

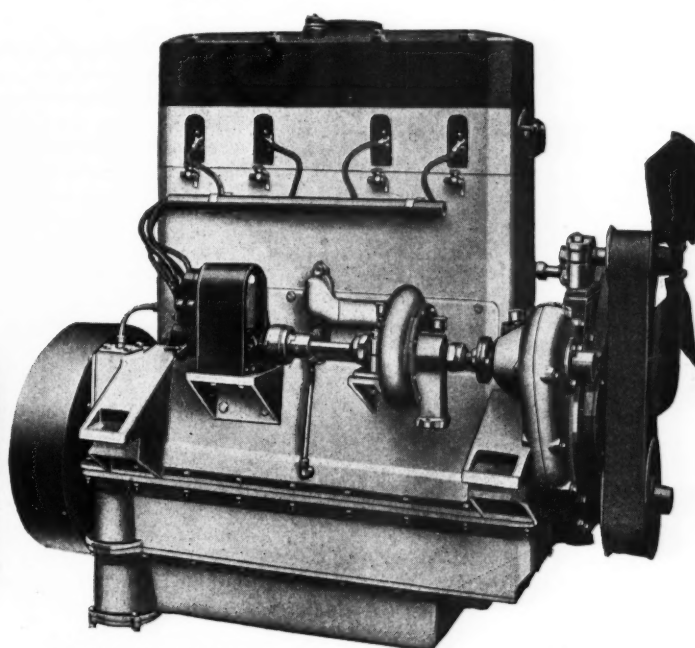
We, the undersigned tractor owners, operators of tractors, or tractor prospects, do hereby ask that the Avery Co. hold a tractor school in Plains some time this winter.

"We do hereby promise that it is our intention to attend the school if possible to do so and to do all in our power to make it a success and to learn all that is possible for us to in the time that the school is here, in the operation, care and repair of tractors, and their appliances."

Then follows the list of forty-three tractor enthusiasts, among whom are thirty owners, the operators number ten, while there are three prospects.



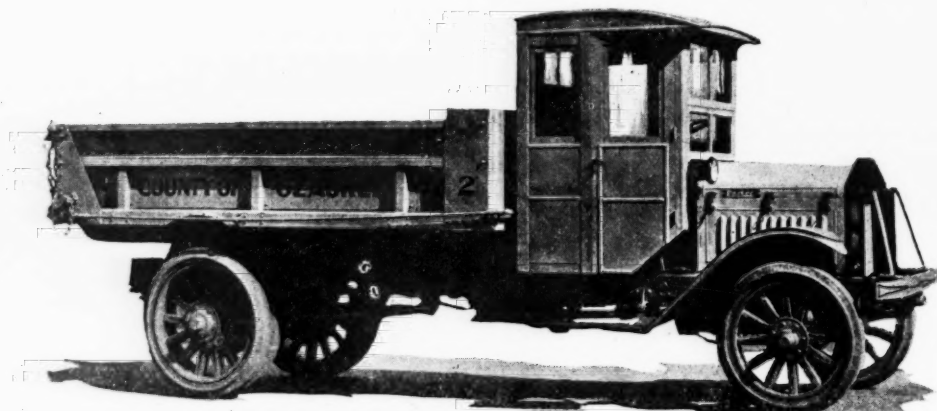
Left side of the Erd engine showing the combined manifolds and the double carburetor for using two fuels



Right side of the engine showing the accessible timing gear housing, removable without disturbing the other parts

## Parker Issues New Truck Design

### Heavy Duty Vehicle With Standard Road Tread Is Unique in Its Class



The new Parker heavy duty truck with standard road tread

A HEAVY duty truck with standard road tread is not common in truck design. However, a 3½-ton truck to meet the demand for heavy duty and high speed work, using standard tread, is being made by the Parker Motor Truck Co., Milwaukee, Wis. The standard wheel track is of value when running on other than paved streets, because the rear tires do not break through the soft part of the road along the standard wagon track.

The complete chassis of this truck weighs 6230 lbs. and is arranged for pneumatic tires, with which it is possible to maintain a road speed of 25 m.p.h. With solids, the road speed is 16 m.p.h., while with cushion wheels it is 19 m.p.h. When using solids the maximum road speed is obtained at 1030 r.p.m. of the engine. While rated at 3½ tons, the truck can handle, it is said, 4½ tons, on average roads.

The engine is a Wisconsin, four-cylinder, 4½ by 6 in., with removable head and is three point suspended. The crankshaft has four bearings and the entire engine is lubricated by pressure feed through a hollow crankshaft. The horsepower at governed speed is 43 hp. Cooling is by pump and cast-shell radiator using staggered vertical tube core. The radiator is mounted on swivel joints. Ignition is by Bosch magneto and the carbureter is a Stromberg.

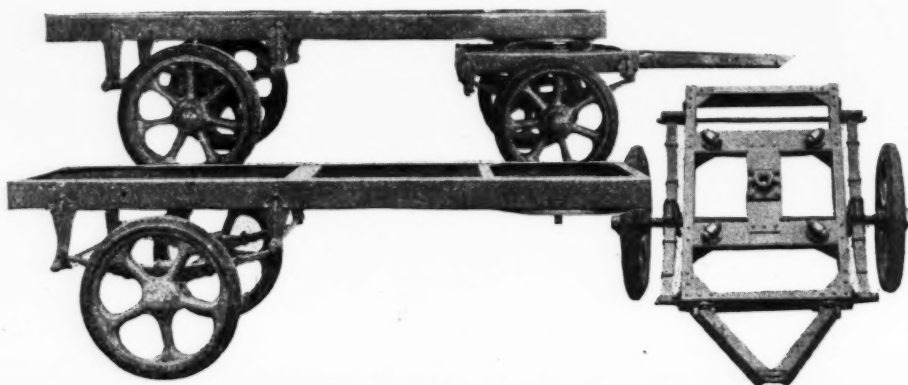
The clutch is a Brown-Lipe dry plate type and the gearset a four-speed Warner. The latter can be removed by loosening four nickel-steel bolts. Foot pedals and gear levers have been mounted on separate tube cross members and in no way interfere with the removal of the clutch, engine and transmission. A double fabric thermoid universal joint is used between the engine and gearset. The rear joint is mounted directly on the rear axle. The latter is worm driven, equipped with Timken bearings. The service brake is back of the transmission, while the

#### SPECIFICATIONS OF PARKER 3½-TON TRUCK

Capacity—7000 lbs.  
Engine—4½ in. bore by 6 in. stroke.  
Lubrication—Pressure feed.  
Carbureter—Stromberg.  
Ignition—Bosch magneto.  
Springs—Semi-elliptic.  
Rear axle—Worm-driven.  
Wheelbase—160 in.  
Starting and lighting—Westinghouse.  
Wheels—Wood or steel.

hand operated set is on the rear wheels, operating on drums 18¼ in. in diameter.

The wheelbase is 160 in. and the road clearance 11 in. The truck has a turning radius of 32 ft. Front tires are 36 by 5 in. and the rears 40 by 10 in. single, or 40 by 5 in. dual. Either wood or steel wheels are supplied. The front axle is an I-section, straight bed, with Timken bearings while the steering is effected by a Ross fore and aft gear. A channel section frame is used which has a loading space of 139 in. back of the driver's seat. It is 90 in. from the back of seat to the center of rear axle. The outside width of frame is 33 in.



Automotive trailer chasses

The fuel tank is welded Terne plate, with 21 gal. capacity.

Equipment includes two dash lamps, tail light, motor driven horn, tools, jack, etc. A Westinghouse two-unit starting and lighting system is installed. Painted in gray lead color, the price of the Parker chassis is \$4,150, f.o.b. Milwaukee.

## Automotive Trailers

THE Automotive Trailer Corp., Chicago, is now in active production on a complete line of trailers for the automotive industry. Trailers are being made to fit the needs of the tourist and the heavy duty truck. Four wheel trailers especially for the fleet operated trucks on inter-city runs have been standardized by this company so that twenty-five models can be made from four frame sizes, five axle sizes, three different sized castings, six spring sizes, and one size of roller bearing turntable. Time consumption for changing over from one model to another has been reduced considerably by this standardization, and design which is extremely accessible.

It will be noted from the illustrations that these trailers are of the turntable type. This company has adopted this

#### AUTOMOTIVE TRAILER SPECIFICATIONS

Tires—Firestone, solid rubber, pressed on.

Wheels—Dayton steel wheels, hubs cast integral.

Bearings—Bock or Bauer Bearings on axle spindle. Bound-Brook Oil-Less Bushings, used on king pin, Fifth Wheel roller, spring bolts, etc.

Axle—Chrome vanadium alloy steel, round, hammered forging, heat treated, dead axle type, taper spindles.

type of steering for trailers for the steering knuckle and king pin type. The turntable is equipped with rollers which are set in oilless bushings, which construction provides ease of steering. The angle of swing of the turntable is very large and permits a turn to be made in the length of the frame of the trailer.

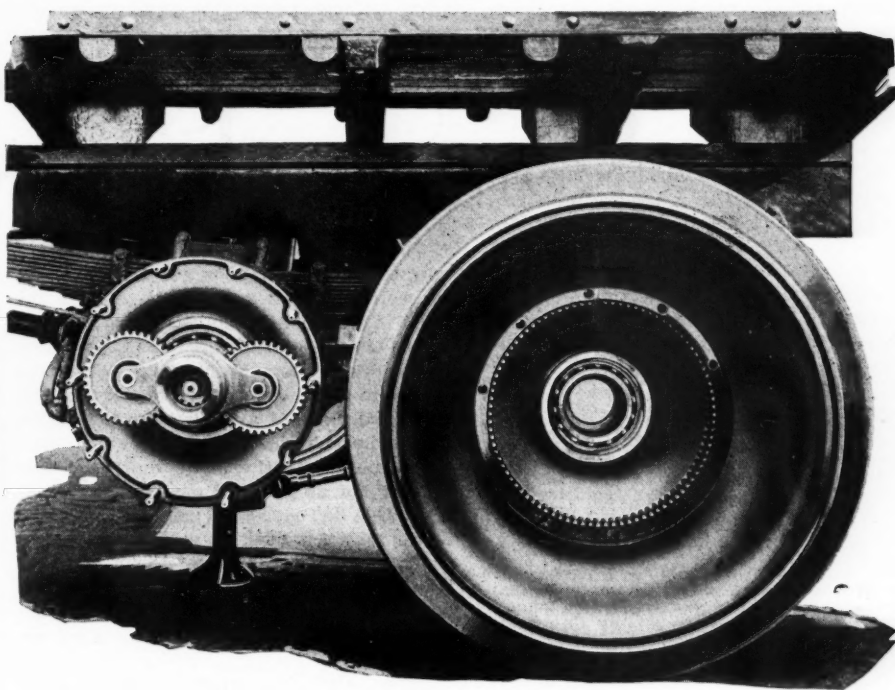
## Edwards Truck Axle

THE truck axle shown here is soon to be put on the market by the Edwards Valve & Mfg. Co., Chicago. This truck axle has never been offered before in the gasoline car field; and yet it has been time-tried and tested, for it has been successfully used on the Walker Electric for the last ten years. When marketed, it will be offered in sizes up to 10 tons.

There are many distinct advantages to this form of construction. The gears are all inclosed in oil tight compartments, so that all bearings and gears run completely immersed in oil. As the greater part of the reduction is made beyond the differential, there is a tendency to minimize the differential action when pulling through sand or on slippery streets and yet permit of satisfactory operation when the truck so equipped is rounding corners. It is entirely self-contained, and is a unit within itself. It possesses the desired accessibility necessary for inspection and repairs.

Drive is positive, with an efficient form of gearing. The oil tight housing serves to protect against dust and dirt, eliminates oil leakage, thus eliminating interference in the efficiency of the brakes due to such cause, as the final reduction is completely enclosed within the wheel and is independent of the brake drum.

Power is received in the usual way by the bevel drive pinion and gear mounted with the differential assembly. The power is further transmitted by means of a drive



New Edwards truck axle

shaft through the center of the load carrying member, to the pinion located in the center of the wheel. This pinion floats between and drives two idler gears, which in the wheel encircling all and keyed to the wheel itself.

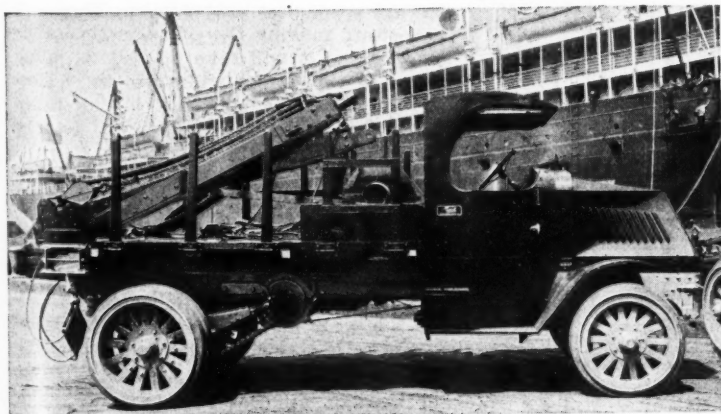
## ALUMINUM CASTINGS CHANGES NAME

Cleveland, Dec. 10—The Aluminum Castings Co. has been reorganized under the name of Aluminum Manufacturers, Inc., with the additional capital needed to extend and develop the manufacture and marketing of aluminum, brass and bronze products.

The new company, besides taking over and continuing to operate the plants of The Aluminum Castings Co. is planning to construct an aluminum forging plant and other plants for making finished aluminum products, the latter being largely the development of the research laboratories of the company.

The management of the new company will be the same as that of The Aluminum Castings Co. and with its increased facilities will be in better position than ever before to keep pace with the constantly increasing demands for the various forms of aluminum products.

## Mack Service Wrecker

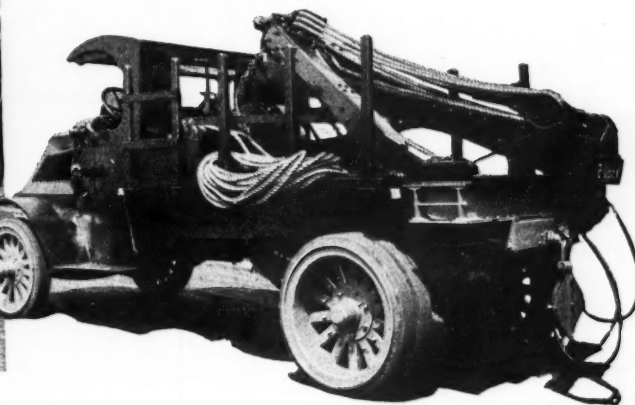


A 7½-ton service wrecker similar to the ones used by the fire departments of many of the larger cities has been delivered to an oil company of Havana, Cuba. The truck is a Mack, and is equipped with a Meade-Morrison horizontal drum winch and collapsible der-

rick. The latter is removable and the body can be used for other purposes.

In use the derrick extends over the rear of the truck. It is capable of lifting the heaviest trucks bodily from the ground and can tow disabled trucks on either front or rear wheels by raising the

other end clear off the ground. Under the rear of the body platform are two I-beams to support the weight of the derrick. Between the I-beams are two heavy 8 by 10 in. wood blocks, which, when the derrick is in use rest on the ground and thus relieve the springs.



# Garage Planning

## Service Station Arrangements

### No. 143

#### PLAN FOR GARAGE

**Q**—Enclosed is a rough sketch of the ground on which we propose to build garage. The ground slopes back from the street to a depth of about 5 or 6 ft. at the back of the lot. We had thought of building one floor 6 ft. below the street and one floor 6 ft. above the street, with a sloping driveway to each floor.

We want a department for accessories, one for vulcanizing, one for repairing, and one for new cars. We also want one wash rack. The balance of the space to be used for storage, furnishing as much storage as possible.

We will appreciate any information you can give us as to what is the best plan for each floor, and if you think they should be as we suggest.—Auto Supply Co., Spencer, W. Va.

The greatest disadvantage you have to contend with is the lack of frontage. If you display your new cars there is no room for anything else and if you display your accessories your cars cannot be shown. Inasmuch as you will probably make most of your accessory sales to your storage customers, and since you need a wide entrance aisle to take care of the two ramps, we believe your accessory display would be about as valuable inside as on the street, consequently we have planned it that way and think it works out very well.

We have made the romps rather nar-

row in order to save space and it might be well to install guide rails to keep the cars in the center so that there would be no chance of rubbing hubs or fenders.

The upper floor would make the best space to rent for public storage, as it would be all light and airy and attractive to prospective customers.

Of course, if the light on the lower floor is not as good as we have surmized it might be better to reverse the two floors, which is entirely practical, making the right hand ramp go down and the left hand one up. Otherwise the plan need not be changed in any respect except the tool room could not extend so far.

Large skylights over entrance aisle and office will do much to make the plan attractive.

### No. 144

#### ASKS ALTERATION ADVICE

**Q**—I am inclosing a sketch of a new garage which is now under construction for us. The masons are now at work building cellar walls.

This building which is being put up for us is to be a two-story brick with steam heat, an office, and an incline instead of elevator. The first floor will have a 10 ft. ceiling, the second, 12; it is planned to give the incline a raise of 1 ft. in 6; is this sufficient? There will be no posts in the building for supporters. We plan to use part of second floor rear for repairs, the remainder for storage.

The first floor we will use for storage and light repairs; also wash and toilet; incline and office to be on right side as marked in sketch. In all probability we will not carry any accessories, as there is an accessory man across the street who gives us good discount. Under the incline will be located cupboards and lockers. After equipping our plant with a bath, drill press and a few other machines, we will need the rest of our capital to carry on our business, as our resources are limited. We are considering the advisability

*MOTOR AGE is receiving many inquiries or garage plans which do not give sufficient information to permit an intelligent reply. There are certain things which should be known to lay out the proper plan for a garage, and inquiries are urged in asking for such plans to be sure to include the following information:*

*Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.*

*What departments are to be operated and how large it is expected they will be.*

*Number of acres on the sales floor.*

*Number of cars it is expected to garage.*

*Number of men employed in repair shop.*

*And how much of an accessory department is anticipated.*

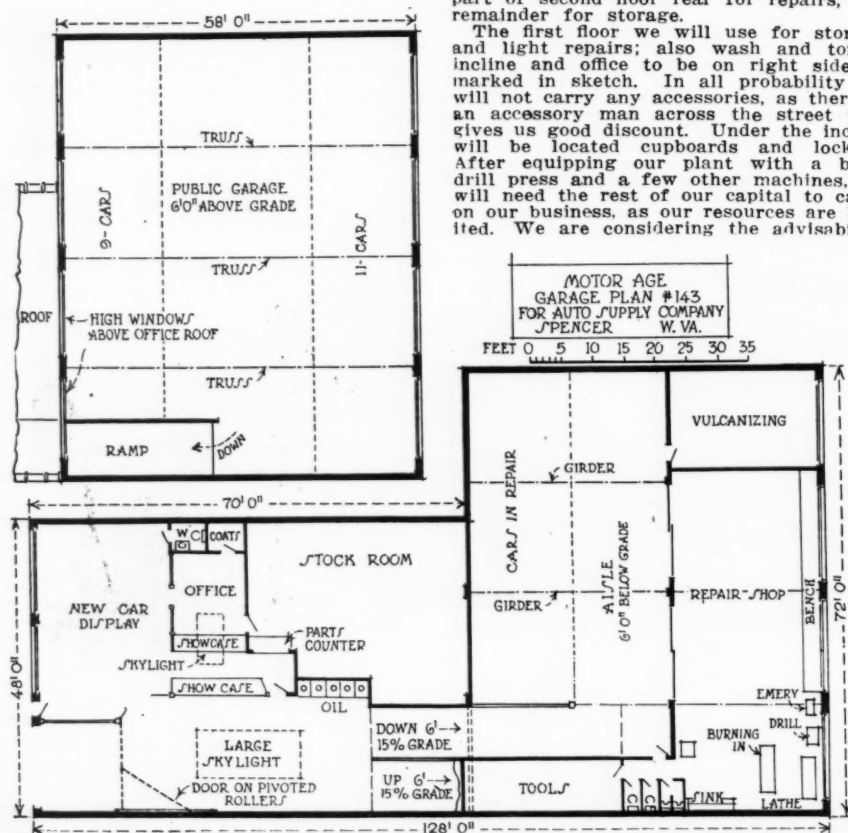
of adding a shop for magnetos and generator repairs, as there is not a first-class shop of this sort in the city, give us your advice on this and the requirements. We have the privilege of altering the building as long as it does not involve any additional expense.—H. E. Hite, Altoona, Pa.

We have altered your arrangement in a few respects which we think will tend to give you better use of your space.

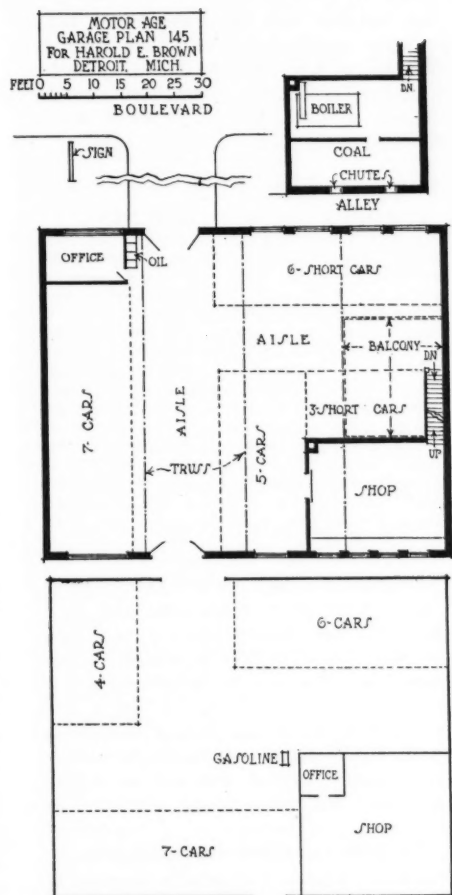
In the first place you should bring your ramp forward in order to get all the storage space possible behind it. That will necessitate moving the office to the other side, where it will take up just as much space as before, but will avoid the necessity of a turning approach to the ramp and make a saving of fifteen to twenty feet or space for three cars.

The next change advisable is moving the shop to the front. By an inspection of the second floor plan you will see that the ramp cuts a big slice out of the front part of it and makes storage of more than one row of cars impossible while the space is just as good for shop purposes as the back. Another reason for this change is that if you use the front for storage, all cars will have to make a complete turn after leaving the ramp or before going down.

You are attempting a difficult problem in eliminating posts from your lower floor and we advise you to install small round, concrete-filled, steel posts. Girders for the fifty-foot span would cut down your head room by at least 1½ ft. and would be excessively expensive. Trusses



Garage with several departments



Garage opening on boulevard

would be worse than girders in these respects. If spaced as shown the parts should not interfere with the cars to any extent.

Your grade of 1 ft. to 6 ft. or 16 2/3 per cent, is generally considered good, though of course the easier the better.

Our opinion on the electric shop is to go ahead; if you are experts in that line you have an inside trade and should draw this class of work from all the other shops, where it cannot be handled. Others have made a big success of this branch of repair, and we believe it is the cream of the business.

## No. 145

### FOR BOULEVARD GARAGE

Q—I am herewith submitting a rough pencil sketch of a garage I am about to build and desire suggestions from you people in the matter.

Said garage is to be 75 by 60 ft. at the rear end of two lots with a driveway to a boulevard between the two houses. I desire as much storage space as possible; also room for a small repair shop. I contemplate excavating a small corner of the building for a heating plant; also the installation of a balcony for the storage of supplies and accessories. The gasoline pump will be located at the boulevard and also an air line.

I shall be pleased to receive suggestions from you in this matter as to building construction as well as floor plan. I desire a clear floor with no posts if possible. Can you furnish me an estimate of the difference in cost of construction of a roof supported by posts or one spanned by steel trusses.—Harold E. Brown, Detroit, Mich.

This has been rather a difficult size to be made small. We have managed to find room for 21 cars, though 9 of them are short and show another arrangement

below 17 large cars and a slightly larger shop but no alley entrance. If your customers are all liable to have large cars the lower plan would be better.

Unless there is enough gasoline business to keep an attendant at the boulevard end of your driveway all the time it is doubtful if this would be a good location for your pump as you could supply all your regular tenants of the garage from a pump either just outside the building or inside if the lower layout is used.

The only way you can get at the difference in cost of the two methods of construction is to get some contractor to figure the building both ways. Wooden lattice trusses are less expensive than steel.

## No. 146

### FOR LARGE LINE OF CARS

Q—We have purchased a lot on the corner of the square and would like to have you help us with our plans so that the building will be as convenient as possible. The lot is 62 by 110 ft. and we have only two sides for outlet and they are both on main streets.

We have considered making it two stories and placing the workshop up stairs. We are handling three makes of cars, Dodge, Buick and Chevrolet, and are handling accessories also. We want to make a very attractive salesroom and maintain our parts also.—Roberts Auto Co., Lexington, Tenn.

Handling three makes of cars as you do, we have given your plan a rather liberal showroom; the stockroom is also rather large, so it will accommodate the three lines of parts without crowding them too much. The only department that is under size is the storage, which will only hold 18 cars when filled to capacity. It could, however, be enlarged at the expense of the paint shop and finishing room.

A stairway leads from the car show-

room to the used car display room on the second floor and another leads up beside the elevator and down to the basement furnace room underneath. The furnace room in this case would be under the entrance corner.

Better light could be had by locating the furnace room under the office and accessory room, with windows under the show window platform and stairway probably in the stockroom.

The room should be trussed to avoid posts on the second floor and can either be carried in sections on the partitions or on full width trusses extending across the whole 60 ft. width of the building. The latter is the better scheme, because it makes changes possible at any time.

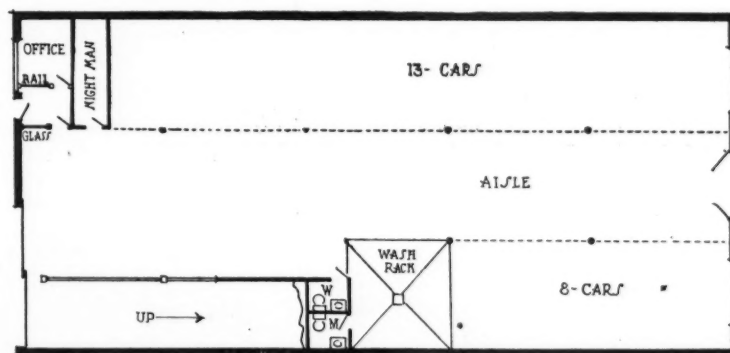
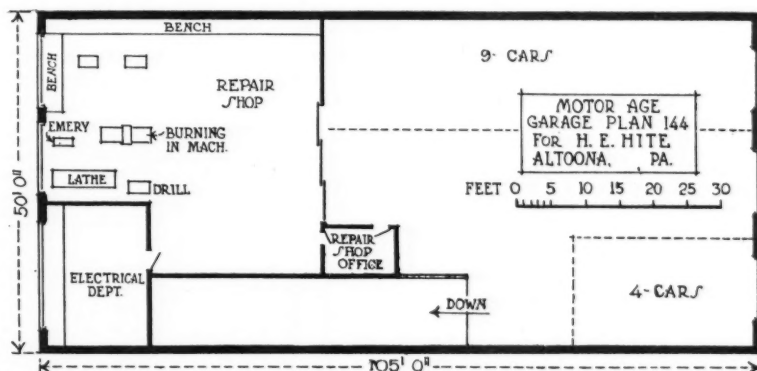
## No. 152

### FOR TIRE REPAIR SHOP

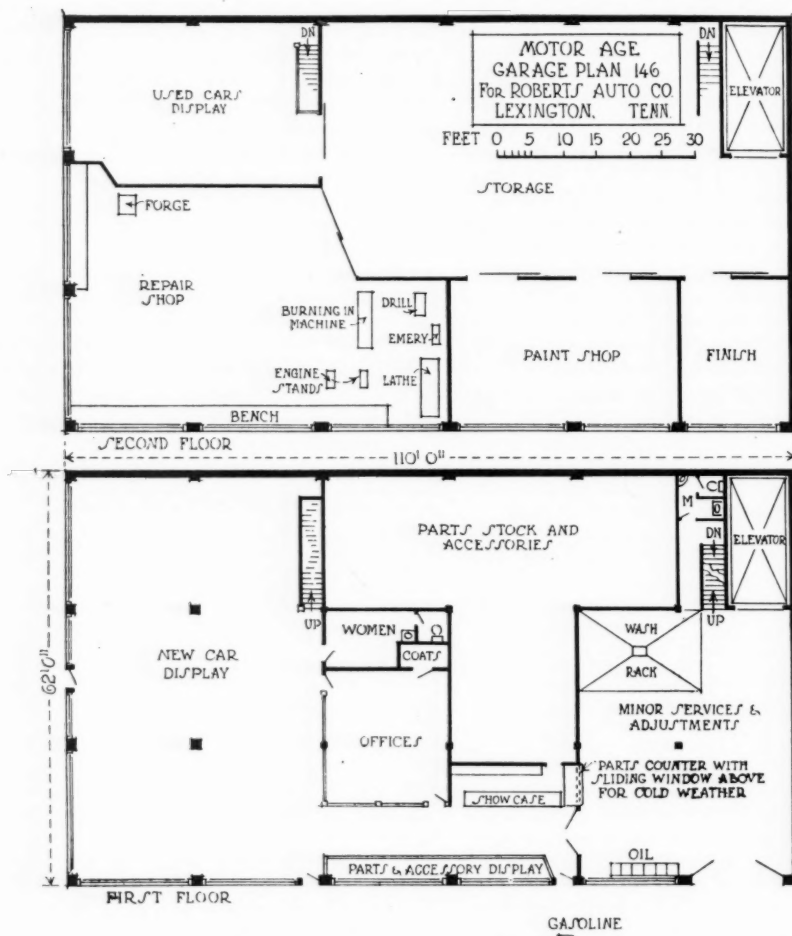
We contemplate installing an up-to-date radiator repair shop and would appreciate some information as to plans for and equipment to be used in such a shop.

We have not yet secured grounds on which to place our shop, but being located in a city of 2500 inhabitants, with prospects good for quite a bit of country trade, we are sure to need a good size, up-to-date shop and would like plans accordingly.—Universal Garage, San Antonio, Tex.

Not knowing anything of the possibilities of the building you may select, we are taking an ordinary 25 ft. corner store building as offering the best example. A corner store would be preferred on account of the better light it affords; and it is absolutely essential to have good light to make any progress in soldering. An inside store would be as well suited to the use if it is a one-story building, well lighted by skylights, or you could use a loft for your shop with a first floor receiving and delivering



Alterations on old building



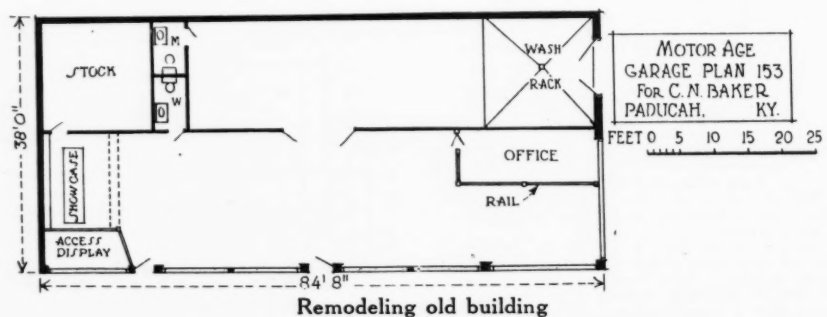
Designed for display of numerous cars

room on the first floor; the latter is not essential, however, if you plan to serve the trade and it might be possible to get consumer customers to come to the second floor.

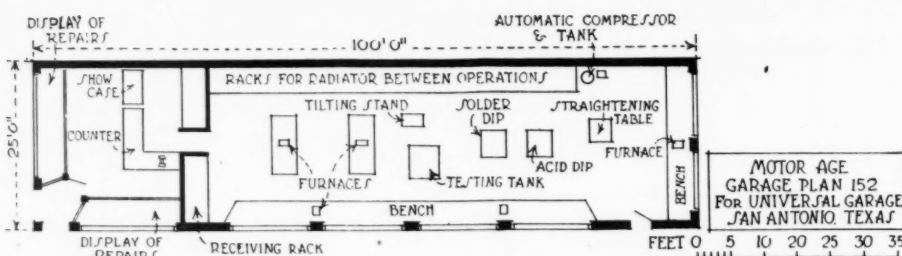
Beside the more common tinner's tools you will need a straightening table having a heavy iron or steel plate for its top; a testing tank about ten inches deep and large enough to hold the largest radiator under water; an air compressor preferably automatic that will maintain a pressure of ten or twelve pounds; stands to hold radiators at different angles while being worked upon, etc. Your benches, too, should be equipped to be used in performing different operations so that when a radiator is received it can be taken to the rear and worked forward through different operations until it reaches the front and the delivery rack. If gas is to be had it will be much

less trouble to pipe it permanently to all your furnaces than to depend on gasoline torches, though torches are essential too, unless you have gas blow pipes to take their place.

If you do a large volume of work it might pay to have solder and acid dipping tanks; there are so many radiators



Remodeling old building



Tire Repair Shop

of the cellular and flat tube types that are easily mended by no other means. This type of work might be allowed to pile up until you had enough to pay to melt the solder properly twice a week or as necessary.

## No. 153

### REMODELING OLD BUILDING

I am considering remodeling an old building located on a corner running 84 ft. front, by about 38 ft. on a side street. There is a brick wall running across the building about 20 ft. back.

I am enclosing a rough drawing of the place and want to use the space 20 ft. by 84 ft. for a showroom and office and accessory store, with plate glass on two sides of this space and single door entrance on the 84 ft. side only.

Using a wide door entrance on the side and using the rear part of the building for a washroom for cars, stock and storage room, and leaving an archway through the brick wall to run cars into showroom and out again.—C. N. Baker, Paducah, Kentucky.

The strip of space 16 ft. wide that is left after your 20 ft. showroom and wall thicknesses have been deducted, is rather scant for wash rack, stockroom, car storage, etc. There is no other space for a wash rack available when there are other cars in the room, except the space in front of the door. One arch should be a great plenty as you will not be taking cars in and out very often.

### TO ISSUE SHOW DIRECTORY

Detroit, Dec. 6—The sixth annual directories for the New York and Chicago National Automobile Shows are being prepared by F. Ed. Spooner, automobile editor of the Detroit Free Press. The Free Press issues these directories annually for the benefit of the exhibitors and all visitors of the automotive industries at the national shows. In addition to the features which have been carried in previous years, there will be added for the 1920 national shows a department containing the names of visiting automotive dealers and distributors from the

entire United States, the names of firms and their representatives, and their stopping points.

### FORM FLORIDA DEALER BODY

St. Louis, Dec. 6—The National Automobile Dealers' association has been working quietly in Florida for the last few weeks in an attempt to organize a state dealers association there. As a result, a meeting of dealers has been called for Orlando, Fla., on Dec. 18.

# The Readers' Clearing House

## Questions and Answers

### Miscellaneous

#### MERCER RACING CAR

Q—Show cutaway view of clutch gear-set and rear axle used on a 1911 Mercer, Series 35 R.

2—Publish picture of a 1912 Mercer racing car driven by Hughes in 500 mile Indianapolis race.

3—Show cut of engine.—H. A. Floyd, Floyd Motor Repair Shop, Washington, D. C.

1—We have no illustration for this.

2—See Fig. 3.

3—The engine of this car is shown in Fig. 2.

#### ADJUSTMENT OF CLUTCH

Q—Publish diagram and instructions showing adjustment of the dry disk mechanics clutch as used on a Commonwealth Partin Palmer Model 32, 1917.—A. Rusch, Dutch East Indies.

The clutch used on this car is shown in Fig. 1. The nut on the end of the shaft designated as A is the means of adjustment. There is only one precaution to observe when tightening this nut up, and that is to see that the cotter pin in the castellated end of this nut is replaced.

#### NEW TROUBLE DISCOVERED

Q—What causes the steering device used on the Dodge Bros. car to squeak when cramped in a certain position. This can be noticed on every Dodge car whether old or new.—C. P. Pohlenz, Blue Hill, Neb.

Here is an inquiry from a dealer suggesting a trouble which we have never heard of as being prevalent in the Dodge car. We invite correspondence on this subject. Perhaps others have had this same difficulty.

#### PITCH ON GEARS

Q—Explain how to figure pitch on gears.

2—Give specifications on all cars since 1912.—Jas. W. Thomas, Kansas City, Mo.

1—Gear pitch is the figure used to represent the number of teeth on a gear having a pitch diameter of 1 in. Thus a six pitch gear is one on which there are six teeth on a gear having a pitch diameter of 1 in. The pitch diameter is the diameter from the pitch line of one tooth to the diametrically opposite tooth. This may at first thought seem to be a curious way to designate gear pitch. But it is very simple in calculating the number of teeth on a gear. For example, a gear having a pitch diameter of 6 in. and a pitch of 8 will have 48 teeth on it.

2—This is a question that we cannot answer in these columns on account of space limitations.

#### QUESTIONS ON COLE SIX

Q—What is the bore and stroke of the 1913 Cole six?

2—What is the speed of this engine?

3—What is the gear ratio of the above car?

Conducted by Roy E. Berg

(Motor Age Editorial Staff)

**THIS** department is conducted to assist dealers, service stations, garagemen and their mechanics in the solution of their repair and service problems.

In addressing this department readers are requested to give the firm name and address. Motor Age reserves the right to answer the query by personal letter or through these columns.

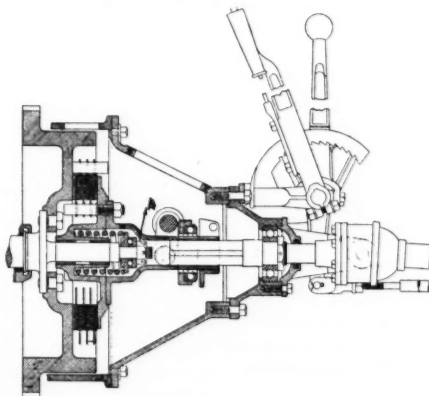


Fig. 1—Illustration of dry disk clutch used on Partin-Palmer car, 1917 model

4—If in good condition what speed should it make with racer body?

5—Should this car give good service at this time with light body or would there have to be other changes made?—B. W. Ellis, East Millsboro, Pa.

1—The bore is 4.13 and the stroke is 4.75.

2—This engine was classed as a moderate speed engine, so that the maximum speed is about 1700 to 1800 r.p.m.

3—The gear ration of the six cylinder model is about 3.8 to 1.

4—With or without a racer body, the gear ratio remaining unchanged, the car-speed will be about 55 miles per hour.

5—The car ought to give good service a good many years yet, but you should change the carbureting system somewhat, so that condensation in the manifold will be reduced.

### Lubrication

#### USE LIGHTER OIL IN WINTER BUT NOT IN LOUISIANA

Q—Is Albert Champion the leading authority on ignition problems in this country? If so, with what firm is he identified?

2—Will medium Veedol, which has been used in the summer, continue to give proper lubrication in cold weather, or would a change to Polarine or some other oil be better. The Veedol is giving 250 m.p. quart.—H. T. Dimick, Shreveport, La.

1—We might have ourselves disliked and cause a lot of argument if we said any one man occupied the premier position in any line connected with the auto-

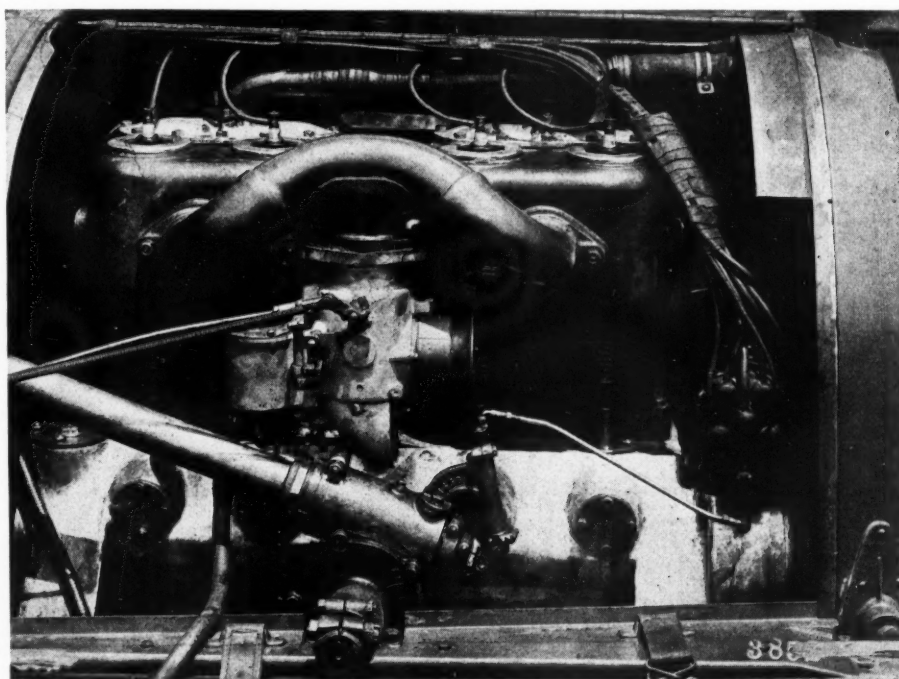


Fig. 2—Right side engine in Hughe's Mercer, which was raced at Indianapolis in 1912

motive industry; we can say, however, that Albert Champion is one of the oldest and most experienced men in the industry and particularly that concerning ignition, and there can't be very much he doesn't know about it. He is the head of the Champion Ignition Co., Flint, Mich.

2—Make, model and condition of the engine would determine to a large extent what oil should be used. It is evident from the fact that you are getting 250 m.p.g. your engine is in pretty good shape. In your section of the country we do not believe it will be necessary to change the grade of oil; in the north, however, it would be well to go to a lighter grade. There is one thing motorists do not heed in winter and that is about starting out before the oil has had time to warm up and right here is where considerable damage is caused. This does not apply so much to a car that is kept in a warm garage and yet it does to some extent. When a car has been standing all night naturally much of the oil has left the bearings, the parts are all cold, the oil more or less stiff, so that by starting out with a rush, or racing the engine at all, will have a tendency to injure the bearings and pistons and cylinder walls because the oil has not had time to reach the parts it should reach. By letting the engine run for several minutes, throttled down with the radiator covered, the water and oil and all parts will soon become warm and will work as they are supposed to. As a result there will be little danger of scoring the cylinders, cutting the bearings or in other ways injuring the engine. It is particularly necessary in thermo-syphon cooled engines that the water system be kept filled up each morning and that the water be allowed to become fairly warm before going out into the cold, for otherwise the water will not circulate at all and a frozen water system is the result.

## Engines

### KEEPING RUST FROM EXHAUST

Q—Publish power curve of the 1919 Chalmers 6-30.

2—What is the best speed if everything is in A1 shape?

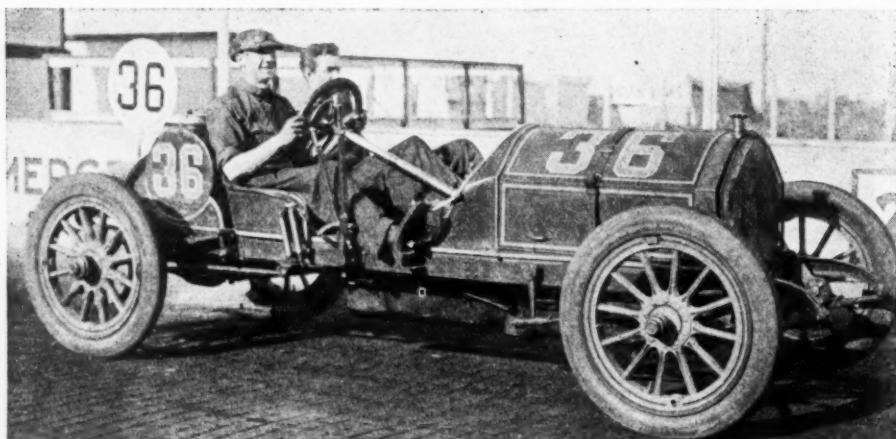


Fig. 3—Hugh Hughes at the wheel of his Mercer, which he piloted at Indianapolis in 1912

**T**O assist readers in obtaining as a unit all information on a certain subject **MOTOR AGE** segregates inquiries in this department into divisions of allied nature. Questions pertaining to engines are answered under that head and so on.

#### MISCELLANEOUS

H. A. Floyd, Floyd Motor Repair Shop... Washington, D. C.  
A. Rusch... Dutch East Indies  
C. P. Pohlenz... Blue Hill, Neb.  
Jas. W. Thomas... Kansas City, Mo.  
B. W. Ellis... East Millsboro, Pa.

#### LUBRICATION

H. T. Dimick... Shreveport, La.

#### ENGINES

J. E. Newman... Bloomington, Ill.  
F. K. Leonard... Brooklyn, N. Y.

#### CARBURETION

A. Rusch... Dutch East Indies  
Chas. Nissens... Paterson, N. J.  
Elmer Fride, Day and Night Garage... Floydada, Tex.

#### REBUILDING

Dr. J. L. McCreight... Industry, Ill.  
George Barringer... Wichita Falls, Tex.  
Alton Barkhurst, Main Street Garage... Burgettstown, Pa.  
O. L. Niesenborn, Santa Fe Motor Co... Sterling, Kans.  
James W. Bauman... Alvin, Tex.

#### THE ELECTRIC SYSTEM

E. C. Engel... Cleveland, O.  
Chas. Nissens... Paterson, N. J.  
M. Charles Knight, Monitor and Shafer Garage... S. Milwaukee, Wis.  
James W. Thomas... Kansas City, Mo.  
W. W. Maynes... Berkeley, Calif.  
Elmer Fride, Day and Night Garage... Floydada, Tex.  
A. Rusch... Dutch East Indies  
James I. Howard... LeRoy, Ill.

No communication without the writer's name and address will be answered in these columns.

3—What could one put on the exhaust pipe to keep it from getting rusty also on the ramhorn?—J. E. Newman, Bloomington, Ill.

1—The curve for the Chalmers 6-30 is shown in Fig. 4.

2—About 58 m.p.h.

3—A good anti-rust compound can be made by mixing boiled linseed oil with flake graphite to form a thick paint. This is applied with a stiff brush so that the

paint is more than laid on the surface of the metal. This paint will smoke a little bit when it is first heated, but after this first smoke the paint will set and will protect the metal well.

#### INSTALLING OVERSIZE WRIST PINS

Q—Instruct how to install new oversize wrist pins in a 1916 Reo Six.

2—How are new bushings installed in the rear universal joint?—F. K. Leonard, Brooklyn, N. Y.

1—This is a task that requires considerable time, both to do and to explain. Because of the engine construction it is necessary to remove the blocks and to do this it is necessary to do a lot of other things first. The exhaust and intake manifold should be disconnected. Be sure that the gasoline lines to the vacuum tank are not bent when they are removed. This precaution does not seem important during the tearing down process, but when it comes to reassembling it might save you an hour or two in time. Fan belt, fan, water connections but not the water pump, should all be removed. After all of the parts are removed that are directly in the way and which prevent the engine bolts from being loosened, loosen the bolts which hold the block to the crankcase. The illustrations in Fig. 7 and 8 will no doubt be of value to you in this task.

A chain hoist should be used to lift the blocks from the crankcase. This is

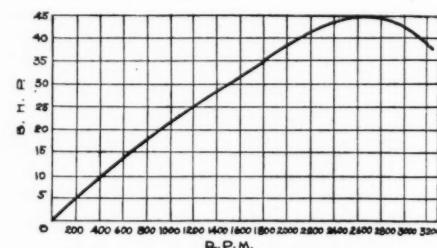


Fig. 4—Power curve of Chalmers 1919 6-30 engine

about the safest way. The blocks are heavy and even though two or three men are available to lift the blocks off, the steadiness and accuracy of a block and tackle operated by one man can not be approached by the men.

After the blocks are lifted off, you can reach down into the crankcase with a small wrench and loosen the nut, which holds the hinged end of the connecting rod. This is on the left hand side of the engine. When this is done the rod and piston can be lifted out. The oversized wristpins should not be purchased until the size of the pins wanted is known. This can be done only by taking the size of the reamer that is used to ream out the cylinder.

## Carburetion

### ADJUSTING CARBURETOR

Q—Illustrate and give adjustment of the Carter carburetor as used on the Partin-Palmer Model 32, 1917.—A. Rusch, Dutch East Indies.

The carburetor used on this car is shown in Fig. 6.

The small button on top of the float chamber is the only adjustment means on this carburetor. It controls the level of

the gasoline in the float chamber. To produce a lean mixture turn this knurled button in the direction of the letter **L** on the screw. If too lean turn toward the letter **H**. The leanness of the mixture can be gleaned by observing the engine performance. If the engine backfires through the carburetor it is an indication that the mixture is too lean. With one hand operating the carburetor valve, intermittently speeding up the engine, the other hand should be used to enrich the mixture. This should be carried out until this backfiring action ceases upon acceleration. This adjustment should not be used to regulate engine speed. The stop arm has a screw on it which controls the extent of the opening in the valve. This is not ordinarily termed an adjustment, merely serving the purpose of obtaining a satisfactory idling speed.

#### INCORRECT CARBURETOR SETTING

Q—An Overland 79 seems to collect carbon quickly but does not smoke. It runs poorly on high when going slow up to 10 m. p. h., but if going at 20 or 25 m. p. h., it works fine but will not take a long hill in high. Does it need new rings?

2—Can the piston be removed without taking the cylinder off?—Chas. Nissens, Paterson, N. J.

1—We do not think that your car needs new rings. This fact is indicated by the absence of smoke. It seems to us that the carbon deposits are formed because of an incorrect carburetor setting.

2—The pistons on this model can be removed by dropping the bottom pan, and removing the pistons from the bottom.

#### CARBURETER NEEDS ADJUSTMENT

Q—On opening throttle quickly on many of the Chevrolet 490 cars the engine will backfire due to a weak mixture and will not idle. As there is no adjustment on the

Zenith carburetor used, how can this be overcome? Understand that this is sometimes caused by some of the passages of the carburetor becoming stopped up. Illustrate by diagram where this usually occurs. —Elmer Fride, Day and Night Garage, Floydala, Tex.

This can be remedied by applying a nozzle of larger diameter to the carburetor. If you do not happen to have a Zenith service station in your vicinity, you can effect this change yourself by using a drill slightly larger than the nozzle diameter, to drill the passage out. There are very few places where the passages may be stopped up as you will be examining the construction of the carburetor in this cut-away picture. All the passages in the Zenith carburetor are large and are not therefor easily clogged up.

## Rebuilding

#### WINTER TOP FOR FORD

Q—Instruct how to put a winter top on a Ford. It is a five-passenger 1918 model.—Dr. J. L. McCreight, Industry, Ill.

Unless you have had some experience in building and fitting tops you are undertaking a big job to make anything like a success of it. Naturally a great deal

depends upon how much you intend to invest in such a top and when you have bought the necessary materials and tools, if you do not own them, perhaps it will pay you better to buy one that is already made. There are so many reasonably priced tops made for Fords that we are of the opinion that this will be the better plan for you.

Something new has recently appeared on the market in the form of a winter covering, made to fit over the regular top of a Ford, and this can be put in place by anybody in a few minutes. Such a top can be purchased for under \$50 for a runabout and probably not a great deal

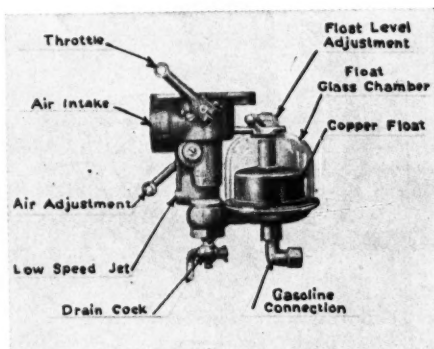


Fig. 6—Carter carburetor used on 1917 Partin-Palmer

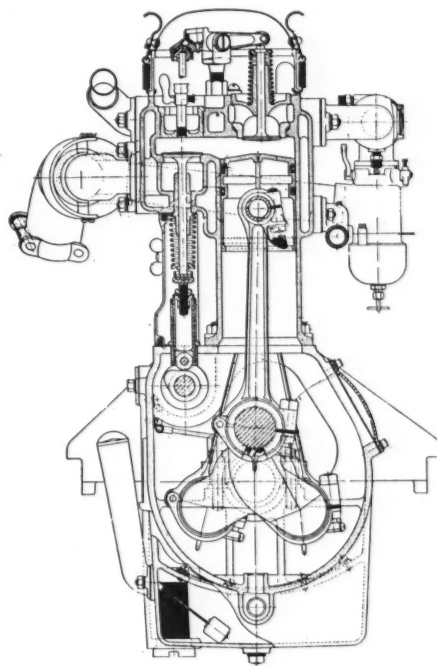


Fig. 8—Cross-sectional end-view of the 1916 Reo engine, showing combination L-head and overhead valve arrangement

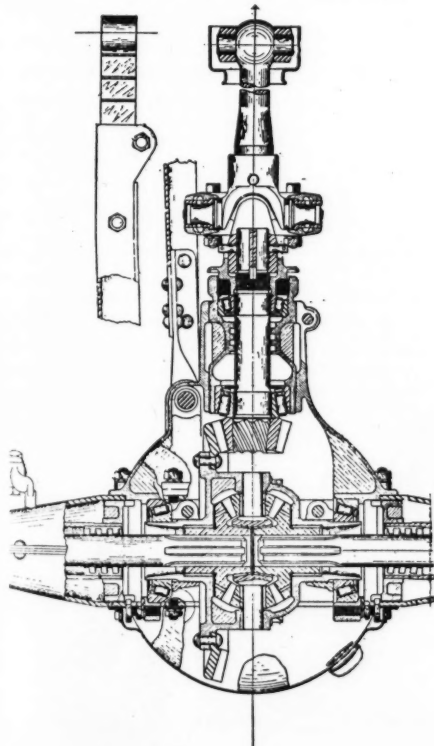


Fig. 5—Rear axle on 1916 Reo, showing construction of universal joint

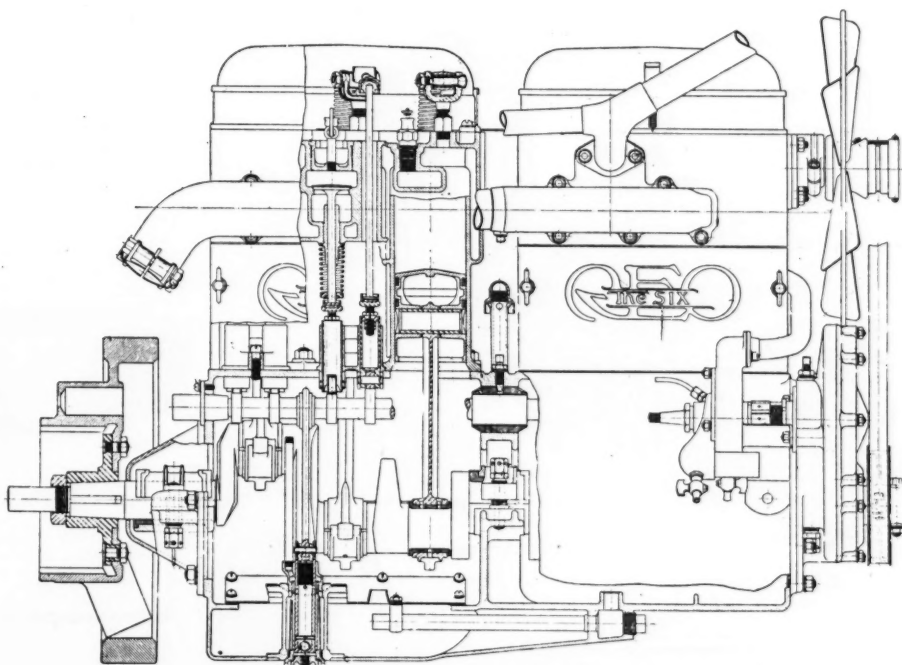


Fig. 7—Cross-sectional view of the 1916 Reo, 6-cylinder engine

more for the five-passenger car. A car can be made reasonably comfortable, however, by a little attention to fitting down the side curtains and by means of a number of extra fasteners, so that little wind can creep in. The same method can be applied to the tops and the sides of the curtains. It will be necessary to have the celluloid in good shape, otherwise this may crack before the end of winter.

Where the curtains lap over the edges of the top and one another a strip of felt can be inserted to take up any opening that might be left. This can also be arranged around the doors, just as you would fix up a window or door that had a crack sufficient to let in cold drafts.

You can buy some small clips which will go over the bead of the windshield top and to the clips can be sewed or riveted on a piece of top material and this sewed or tacked to the front of the top. By this means the wind will be prevented from sweeping in over the top of the windshield. So far you will simply have to use common sense in the operation, and if there is a buggy maker nearby you can probably get a lot of help from him in such a matter.

You are so near Bushnell or Macomb, or even Quincy or Peoria, that it would not take long to run to one of these places to see what can be had in the way of assistance. But you can get on fairly well alone if you are handy with tools.

The hardest part will be in the fitting of some sort of doors. You will need them only on the right side, so that the left can be closed up entirely and made as fast and close in fitting as possible. An extra piece or pieces of top fabric can be utilized to lap over the joints in the side where the side curtains come together, making these places doubly windproof. A sailors' bent needle or one

used by upholsterers can be utilized to advantage in sewing where the pieces are on the car, as the bent needle will permit reaching in and out. The doors on the right side will require some form of frame and while this can be made of wood, it will be better to have them of about 5/16-inch iron and built in the shape of an inverted U, as shown in Fig. 9.

With the ends flattened a little these can be attached to the inside of the doors by means of brass wood screws, the screws being sent into the wood frame. The iron frame should be only high

enough to clear the under edge of the top. You will have to use some discretion in the fitting, of course. The regular side curtains can be stretched over the iron frame and with a strip of top fabric along each side and along the top edge, made wide enough to overlap the curtains proper and made stiff by adding two or three pieces, a reasonably close fit can be made. By using the ordinary side curtains you will have the benefit of having the windows already there. You can, of course, make the iron frame a little wider and by using new fabric, with a celluloid window stitched in them a still better joint can be made. Naturally there is room for the display of ingenuity in such an undertaking.

#### WANTS TO BUILD CYCLECAR

Q—Where can a distributor for a Pierce four motorcycle be secured? The engine has a Herz magneto.

2—Publish sketch for miniature cyclecar similar to those made by Capt. Art Smith, the famous aviator, using Pierce four engine with multiple disk clutch.

3—Show arrangement of engine in frame.

4—Where could a differential suitable for this job be secured?—George Barringer, Wichita Falls, Tex.

1—Almost any sort of four-cylinder distributor can be made to work with a magneto furnishing the current and any supply house can furnish one. Or try the maker of the engine.

2—This is shown in Fig. 4.

3—See Fig. 4.

4—Do you mean a rear axle in which is incorporated the differential? The Woods Moblette Co., Harvey, Ill., made a narrow tread cyclecar which had a typical axle housing and of course differential complete. Possibly this concern will be able to furnish one. Otherwise try the Puritan Machine Co., Detroit, Mich., which handles parts for many of the cyclecars made some years ago.

#### REBUILDING SCRIPPS BOOTH

Q—Publish body design for a speedster body on a 1915 3-passenger Scripps Booth using the regular Scripps Booth radiator and hood, no fenders but with a removable top and wind shield to be built on the Rolls Royce lines.

2—Where can specifications and plans be secured to build this body?—Alton Barkhurst, Main St. Garage, Burgettstown, Pa.

1—See Fig. 11 for this design.

2—We know of no one furnishing plans to build car bodies. The body builders, of course, have their own plans and if your persuasion can overcome

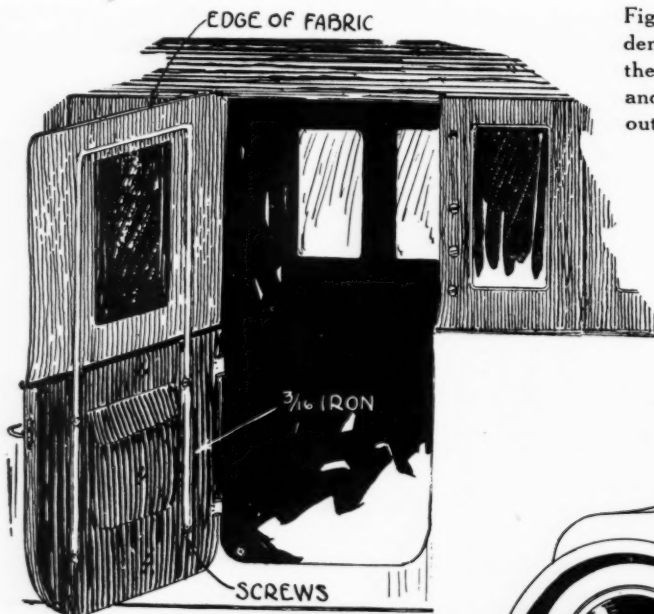


Fig. 9—Arrangement for attaching winter top on Ford car

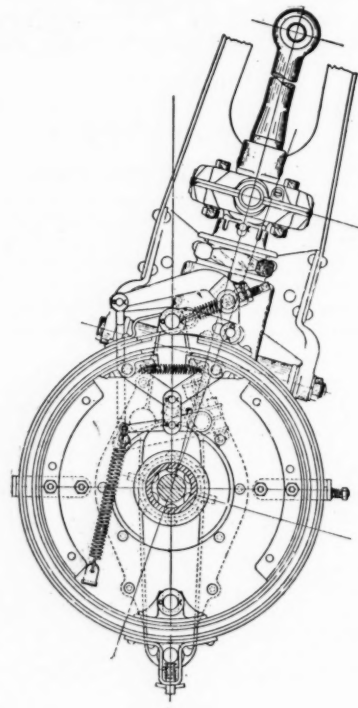


Fig. 10—Another demonstration of the universal joint and rear axle layout on the 1916 Reo

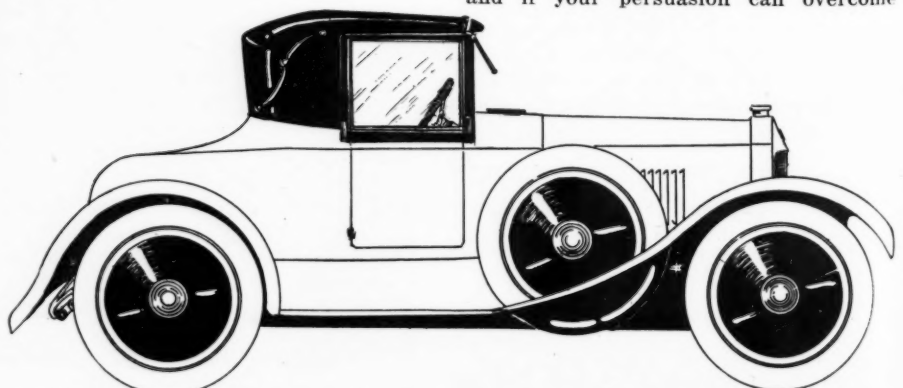


Fig. 11—Neat coupe speedster design for Scripps-Booth car

their reluctance in parting with their plans you might obtain some plans or some information that will help you make your plans.

### BUICK SPEEDSTER DESIGN

Q—Publish speedster design for a 1915 Buick 25.—O. L. Niesenborn, Santa Fe Motor Co., Sterling, Kans.

This is shown in Fig. 14.

### SPEEDING UP A CHALMERS

Q—What model is a 1916 Chalmers six with overhead camshaft?

2—Publish speedster design for a 1916 Chalmers with winter tip using fenders?

3—How should it be geared to get about 70 m. p. h.?—James W. Bauman, Alvin, Tex.

1—You undoubtedly have reference to the Chalmers 6-40, which was made in 1916.

2—This is shown in Fig. 13.

3—A gear ratio of about 2.75 will be necessary in order to obtain this speed.

## The Electric System

### INSTALLING BOSCH MAGNETO

Q—Publish a wiring diagram for a 1913 Oakland Model 42 equipped with Delco ignition.

2—Could a Bosch D. U. 4 magneto be installed on this car?—E. C. Engel, Cleveland, O.

1—This was shown in the Oct. 16 issue of MOTOR AGE.

2—Yes, the American Bosch company is prepared to supply you with a magneto which will fit your car. It has the attachments and all that is necessary for you to do is to install the parts.

### CHARGING OF GENERATOR

Q—Is the generator on an Overland 79 working O. K. when it charges 10 amp. without a load and with a load of two 32-c. p. 6 to 8 volt headlights and four 2-c. p. 6 to 8 volt? The generator is a Gray & Davis with a governor.

2—Can the governor be removed and make solid connections thereby getting more current when all lights are on? At such times there is not enough current left for motor Klaxon horn. The cut-out or breaker cannot be regulated.

3—The starter works O. K. but why do all lights go out when using starter?

4—Can a 6 volt amp. storage battery instead of the four dry cells be used for starting spark?

5—There are only two brushes on the generator. Is it possible to move those brushes off the neutral point by drilling a new hole in the casting, to move the brush and cover of the generator, about 1/8 to 1/4 in. beyond center line thereby getting more current?—Chas. Nissens, Paterson, N. J.

1—Yes, we would say that this is a very satisfactory charge rate with this load. In fact, this rate is rather high when it is considered that the lamp load will consume about 8 amp. This would mean that the charging rate without the lights burning will be about 18 amp. It is not recommended that the charging current be this high unless unusually heavy demands are being made on the battery.

2—In the case of this Gray & Davis generator, the charge rate can be increased by increasing the tension of the spring on the friction governor. The

spring can be set so tight that there will be no variation or slippage at all, regardless of the speed of the engine. One thousand r.p.m. is the predetermined speed of this generator, however, and it will deliver enough current for the battery under ordinary driving if the generator is not worn to the point where the mica on the commutator is high.

3—It is probable the battery is low. If the lights dim way down but still give a perceptible glimmer, this is undoubtedly the case. However, if the lights go out completely when the starter pedal is depressed, then there is a possibility that the connection which leads from the starter switch is loose.

4—Yes.

5—This can be done. However, there is apt to be some sparking at the brushes due to the shifting of the brushes. The

### SUGGESTS ANOTHER ANSWER

South Milwaukee, Wis.—Editor MOTOR AGE—In the Nov. 20, 1919, issue of the MOTOR AGE, I noticed R. Johnson, Kansas City, Mo., has trouble in starting a Maxwell using Simms-Huff electrical system. Being in the trouble shooting game a long time I have come across the same trouble.

If he will look up this wiring diagram he will find this model used four dry cells. He will see by following the diagram that when the magneto was taken off and overhauled and then put back in place again the positive wire was placed on the wrong terminal on the magneto breaker box. This causes a bucking of the primary winding in the magneto when he wishes to use the starter motor because the dry cell circuit is brought in contact when starter button is pressed.

By having the cell current flowing wrong it bucks the magneto. Of course, he can start with hand crank because the starter button is not pressed in to make contact in the battery circuit. If he reverses the two wires at positive and negative side of the dry cells, I think his trouble is solved. This same trouble has come to my attention dozens of times because the owners of this Maxwell would replace the cells themselves and replace the wires on the wrong terminals. Then the cell current will buck the primary current in the magneto. Points on the spark plugs were set too close if he got the engine started with the wiring in this condition.—M. Charles Knight, Mollitor & Shaffer Garage.

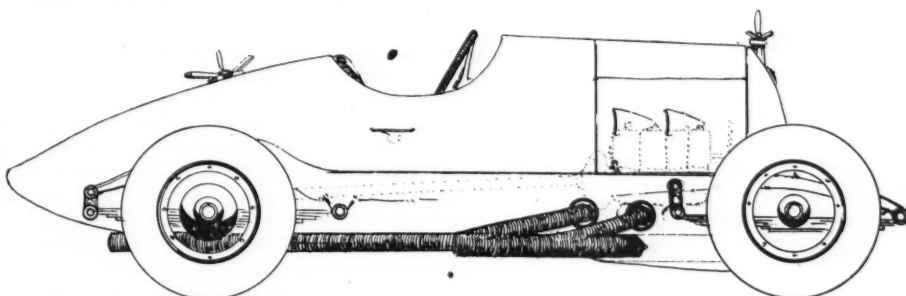


Fig. 12—Small with fast lines, using 4-cylinder motorcycle engines

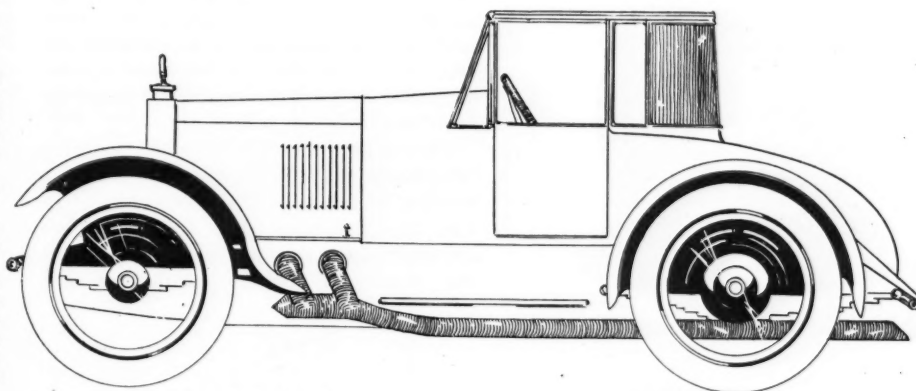


Fig. 13—Sport model design for 1916 Chalmers with a winter top

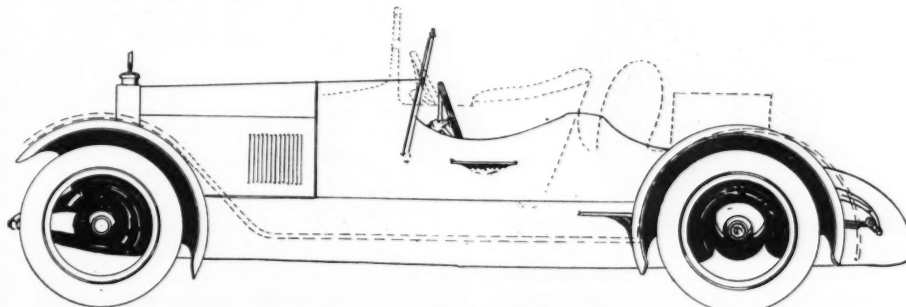


Fig. 14—Speedster design for Buick 25, 1915

## The Why and Wherefore of the Alternating Current Motor

Q—Thoroughly explain what makes and why does an alternating current motor run?—James W. Thomas, Kansas City, Mo.

There are several types of alternating current motors. A series motor when designed for this purpose, will run on either direct or alternating current. A squirrel cage motor is purely an alternating current type, as is the synchronous motor.

The induction motor is one of the most commonly used alternating current motors and it is this type we take up and explain here.

The induction motor consists of a primary member called the stator, and the secondary member called the rotor. Fig. 15 shows an illustration of the stator and Fig. 16 a picture of the rotor. The field frame or stator is the stationary part of the motor and the rotor as the name implies is the rotating element. The alternating currents which are fed to the stator only, produce a rotating state of magnetism in the laminated iron. This rotating magnetism induces currents in the short circuited rotor windings, and the stator magnetism exerts force on these induced currents and causes the motor to revolve.

The construction of the rotor is not like the construction of an armature of an ordinary direct current motor. The rotor which is shown in the illustration is of the commonly called squirrel cage type, and its windings consist of heavy copper

rods placed in the slots which are nearly closed. The ends of these heavy copper rods are connected to massive short circuited upper copper rings.

The type of rotor just described is used mainly on small machines. For large machines the copper bars are made smaller and wound on the drum of the rotor in a manner similar to the winding of the large alternating. These windings are brought out at the end of the rotor and connected to copper slip rings. From these slip rings the windings are short circuited through variable resistances which are cut in, in series with the rotor winding at the moment of starting and when the synchronous speed has been reached these windings are short circuited out of the rotor circuit. This is for the purpose of producing a larger starting torque which for the induction motor is characteristically poor.

### THE ACTION OF THE INDUCTION MOTOR

The action of the induction motor may be described in two steps, namely (a) the production of rotating magnetism by the stator winding, and (b) the action of this rotating magnetism on the short circuited rotor. Action (b) is simple and may be stated as follows: See Fig. 18. Imagine a squirrel cage rotor to be placed between the poles of a mechanically rotated direct current excited field magnet, as indicated in the illustration. The action of this revolving magnet upon the short-circuiting rotor windings is exactly equivalent to the action of the stator upon the rotor. The revolving magnet induces currents in the short-circuited rotor rods, and because of these currents the rotor rods are pushed sideways by the magnetic flux which emanates from the revolving magnet poles.

Figure 18 represents an end view of a two-phased induction motor with a stator winding like that which is represented in Fig. 17. The rotor slots and conductors are omitted for the sake of clearance and the bands of stator conductors are

shown slightly separated from each other so that they may be easily distinguished.

Before proceeding to the discussion of the action of the stator windings it is necessary to consider the effect of current in a band of conductors between the masses of iron. This effect is shown in Figs. 19, 20 and 21. The small circles with dots represent conductors carrying up-flowing currents and the small circles with crosses represent down-flowing currents. The action of the currents in these bands of conductors is to produce magnetic flux along the dotted lines in the directions indicated by the arrow. The lines A' and B' are clock-diagram lines, to be thought of as rotating in a counter-clockwise direction; and their projections on the fixed line ef represent at each instant the value of the current which flows in the A bands and B bands of conductors respectively.

At the instant represented in Fig. 19, the current in the A bands is at its maximum value, the current in the B bands is zero, and the magnetic flux due to the stator windings is at this instant represented by the dotted lines in the illustration. Where the flux passes from the stator iron into the rotor iron the stator iron has North magnetic polarity, and where the flux passes from rotor iron into stator iron, the stator iron has South magnetic polarity. The location of these polar areas at the given instant is indicated by the letters N S N S.

When the lines A' and B' have rotated  $\frac{1}{8}$  of a revolution ( $\frac{1}{8}$  of a cycle) as shown in Fig. 20, the current in the A bands has decreased and the current in the B bands has increased, the two currents have become equal in value, and the magnetic flux due to the stator windings has shifted as indicated by the dotted lines in Fig. 20.

When the lines A' and B' have rotated  $\frac{1}{4}$  of a revolution ( $\frac{1}{4}$  of a cycle) as shown in Fig. 21 the current in the A band has decreased to zero and the current in the B bands has increased to its maximum value, and the magnetic flux due to the stator windings has shifted still farther as indicated by the dotted lines in Fig. 21.

As a matter of fact the magnetic flux due to the stator windings shifts continuously forward and by comparing figure 4a with figure 4c it may be seen that the forward shift of the polar regions during the  $\frac{1}{4}$  cycle is equal to  $\frac{1}{2}$  the distance from the North pole to the South pole. In a whole cycle, therefore, the forward shift of the polar regions is two times the distance from N to S, which is equal to the distance from N to N. Since there are two pairs of poles the foregoing statement is equivalent to saying that the stator magnetism makes a revolution in  $p/2$  cycles where p is the number of polar regions on the stator frame. Therefore, if the alternating current supplied to the stator windings

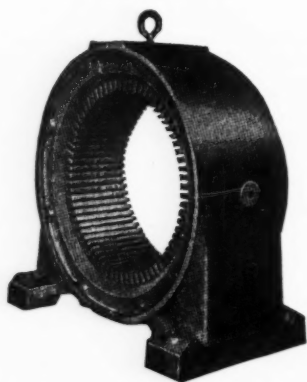


Fig. 15—The stator of an induction motor

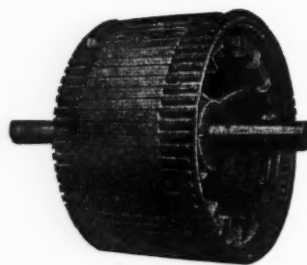


Fig. 16—The rotor or revolving part of an induction motor. There is no electrical connection between the rotor and the stator except through the magnetic lines of force

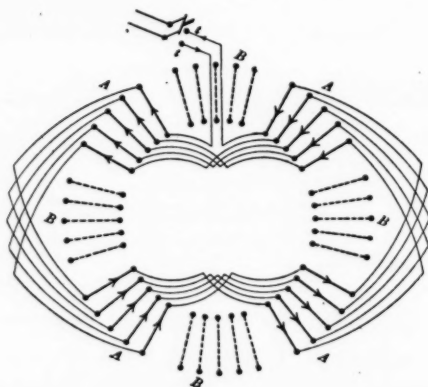


Fig. 17—Diagrammatic layout of the stator winding in an induction motor

have a frequency of  $f$  cycles per cycle, the formula

$$n = \frac{2f}{p}$$

is obtained in which  $n$  is the speed of the stator magnetism revolutions per second.

### CUTTING GENERATOR VOLTAGE

Q—The generator on a 1916 Maxwell 25 charges at 22 amp., when regulator is on "high" and 16 when on "low." How is the voltage of generator cut down?—W. W. Maynes, Berkeley, Cal.

We assume that by high and low you mean the amperes of flow when the resistance is out of and in the field circuit of the generator. Refer to Fig. 22 which shows the cut-out and regulator on the Maxwell of 1916. Remove the four screws holding the panel on the dash, and tip the panel over so as to make the wiring on the back of the panel accessible. In case the wires are not long enough to permit the panel to be pulled out the wires should be gently pulled out to create enough slack to allow the panel to be tipped back. With a screwdriver remove the terminal on back of the ignition switch marked "Bat." and insert a good ammeter of suitable range in this circuit. Care should be taken to see that no grounds are made when making these connections. The next step is to remove the screw which holds the cover on the regulator box. Use a pair of thin nosed pliers and bend the hook (1) on cut-out armature (2) back so as to decrease the tension on the clock spring (3) which is used for adjusting the cut-in point.

The engine should now be started and run at a speed corresponding to a car speed of 15 to 20 m.p.h. and the charging rate adjusted to between 13 and 15 amperes by bending downward the hook (4). In making this adjustment it is wise to press the regulating armature down so that the current will not to an excessive value and thus destroy the fuse.

### WIRING DIAGRAM OF WESTINGHOUSE REGULATOR

Q—Give internal wiring diagram of the Westinghouse regulator used on Model N

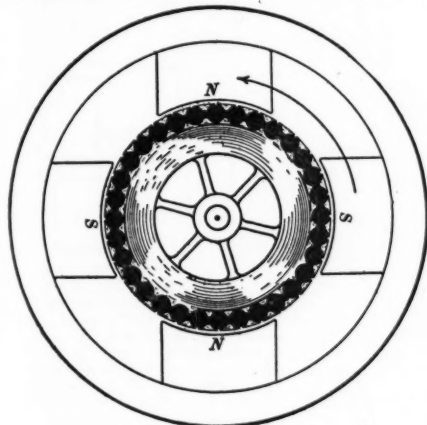


Fig. 18—Showing layout of copper bars on the rotor of an induction motor

Hupmobile. On one of these regulators used on above car the low voltage cutout points vibrate almost constantly. It seems to charge all right and when racing the engine will show as high as 20 or more amp.

charge. What causes the low voltage and cutout points to vibrate after they have once come together? Ammeter needle is steady and indicates good charge.—Elmer Fride, Day and Night Garage, Floydada, Texas.

The Winter Service Issue of Motor Age, Nov. 6, page 71, showed the diagram for this regulator. There are some conditions that are very conflicting. They

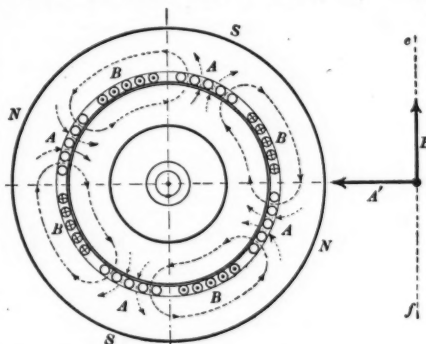


Fig. 19—Diagram showing value of the currents in the windings of the induction motor

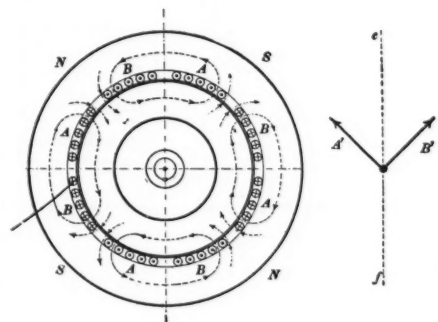


Fig. 20—This diagram is the same as Fig. 19, except that the current cycle has advanced one-eighth of a revolution

should not indicate a steady charge with the low voltage cut-out points opening and closing intermittently. About the only abnormal condition that would cause this would be a short circuit which goes around the arm of the cut-out. Examine the regulator and see if there are any burnt wires in it. Very often a short circuit is caused by connecting the terminals of the generator in reverse order to the wires which lead to the regulator.

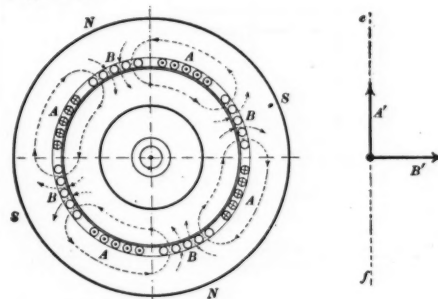


Fig. 21—The same winding advanced one-eighth of a revolution more illustrating the growth of the winding in the field winding

### SUPERHEATING OF GENERATOR

Q—What causes a superheating of the Disco six-volt generator used on the 1917 Model 32 Partin Palmer? After a few minutes the temperature will be very high, so that the soldering of the commutator becomes loose, causing a flashing fire on

the brushes. The third brush is fixed and cannot be moved in another position.

2—Publish wiring and internal diagram of the Disco six-volt two-unit system as used on this car.—A. Rusch, Dutch East Indies.

1—It seems as if this "superheating," as you call it, has at some time or other shorted out a few turns of the armature circuit. This will cause the remaining coils to be overburdened and make them heat. We advise you to try out the following scheme to test the coils of the armature. The tester shown Oct. 23, should be clamped around the armature, and with the aid of a millivoltmeter try the resistance drop across each pair of adjacent segments. The tester will serve as means to create a path for the current through the commutator. When a pair of segments is found where the drop is a great deal more than across any other pair of segments, you will have determined what we believe to be the cause of the trouble. It may be necessary to rewind the armature coil if the wires are badly burned or the insulation bruised.

2—A diagram for these connections is shown in Fig. 00.

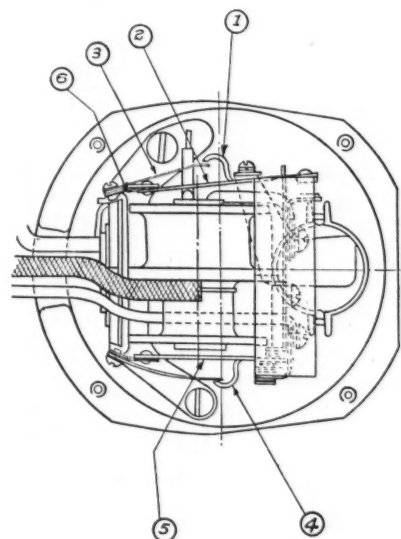


Fig. 22—Layout of regulator and cutout on a 1916 Maxwell 25

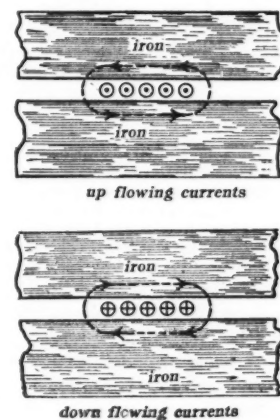


Fig. 23—Showing rotative direction of the magnetic currents induced as a result of conductors carrying current toward the eye of the reader in the case of up-flowing currents and away from the eye of the reader in the case of down-flowing currents.

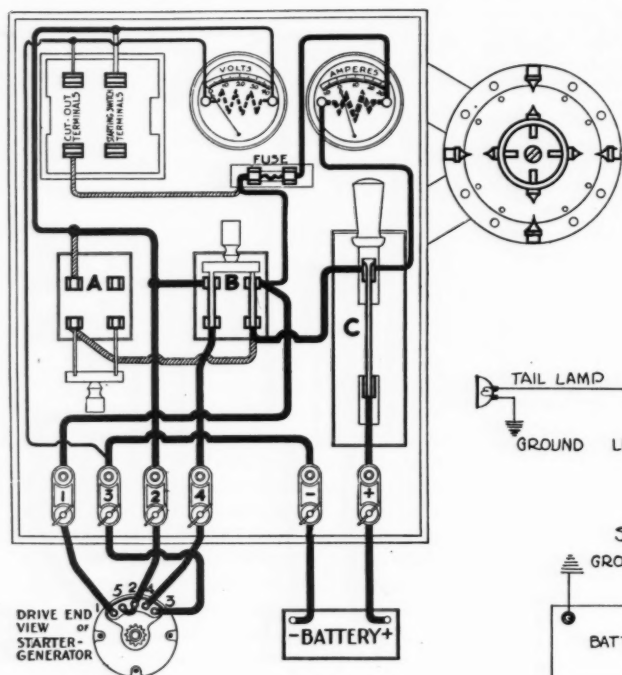


Fig. 24—Testing board

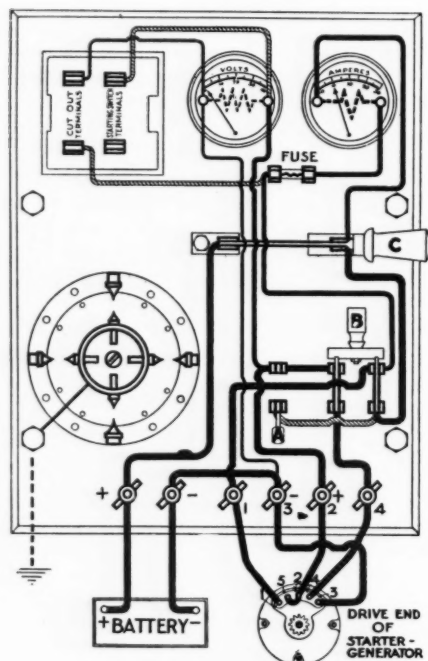


Fig. 25

### TESTING OUTFIT FOR GENERATORS

Q—Explain and illustrate the most practical way to make a switch board or testing outfit for generators and starters, especially Northeast on Dodge cars. We have ammeter and voltmeter and two double pole switches.—E. D. Steiger, Owl Garage, Paris, Tenn.

In Figs. 25 and 26 we show the illustrations of the test board which is recommended because this is the board that the North East company makes and uses to test their own apparatus. The first illustration shows the connections for a four terminal North East starter-generator. A storage battery is connected to the positive and negative terminals as marked and shown. The second illustration shows a high tension current test.

The testing board to the left and the one immediately below it are of standard design, made by the North-East Electric Co., Rochester, N. Y. With either of these boards, it is possible to test out generators, motors, ignition systems and batteries.. Two types of boards are shown, one with the spark tester contained and the other with the spark tester set on a bracket to one side.

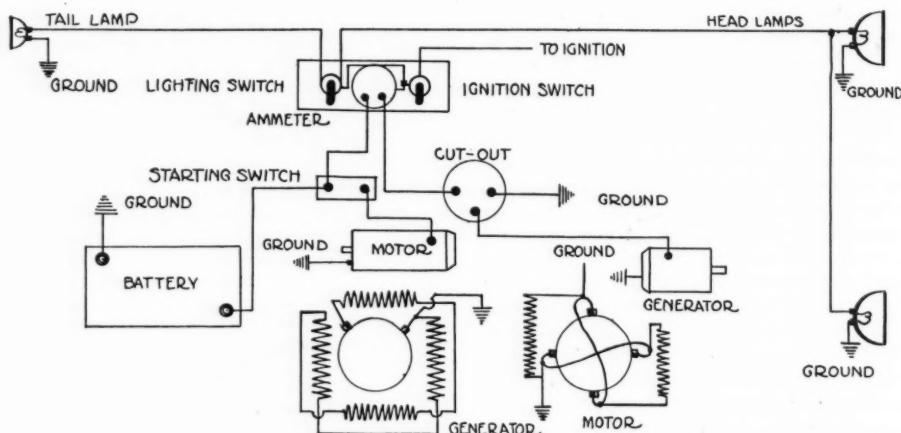
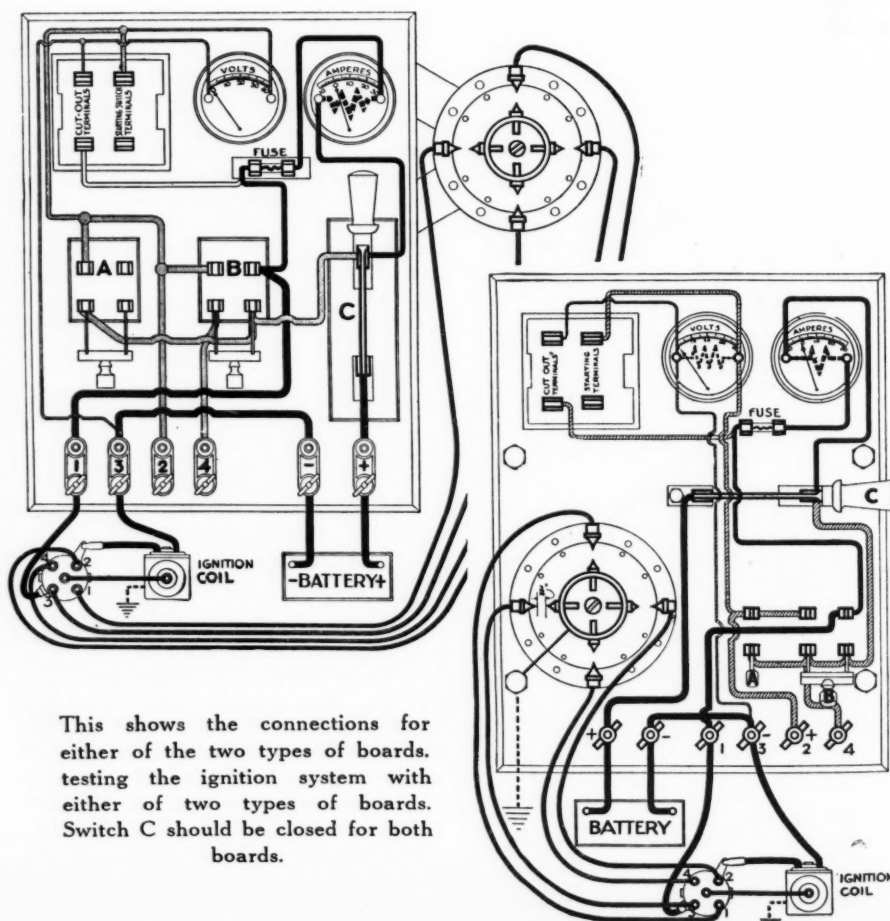
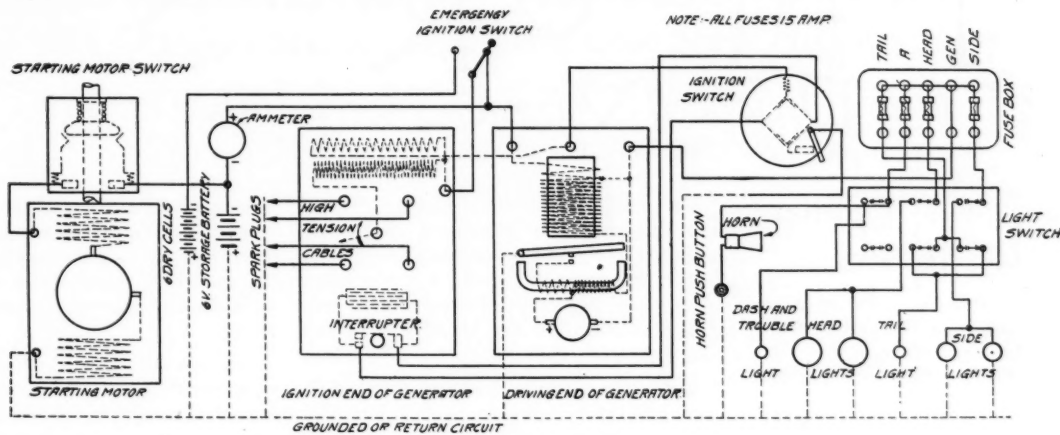


Fig. 26—Diagram showing installation of Disco system on a 1917 Partin-Palmer. The internal connections of the motor and generator are shown in the small inserts

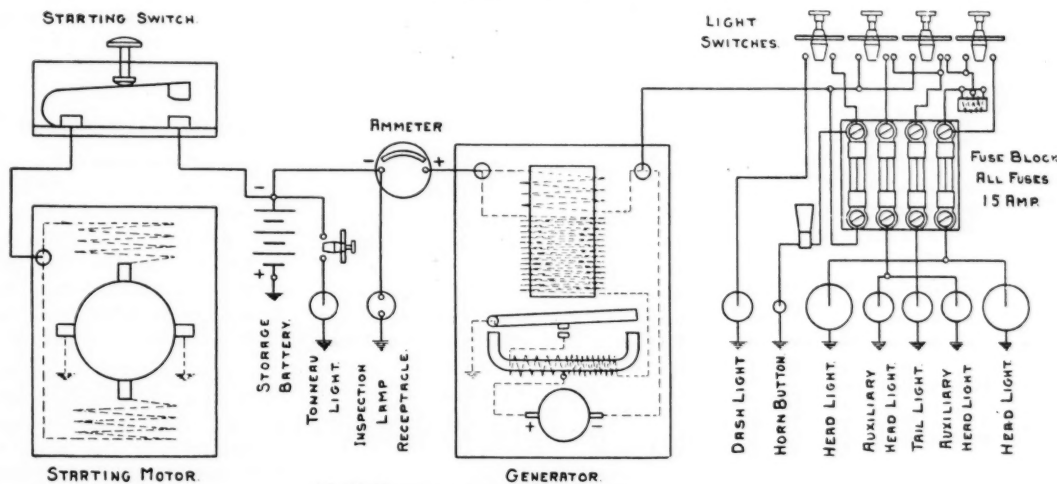


This shows the connections for either of the two types of boards. testing the ignition system with either of two types of boards. Switch C should be closed for both boards.

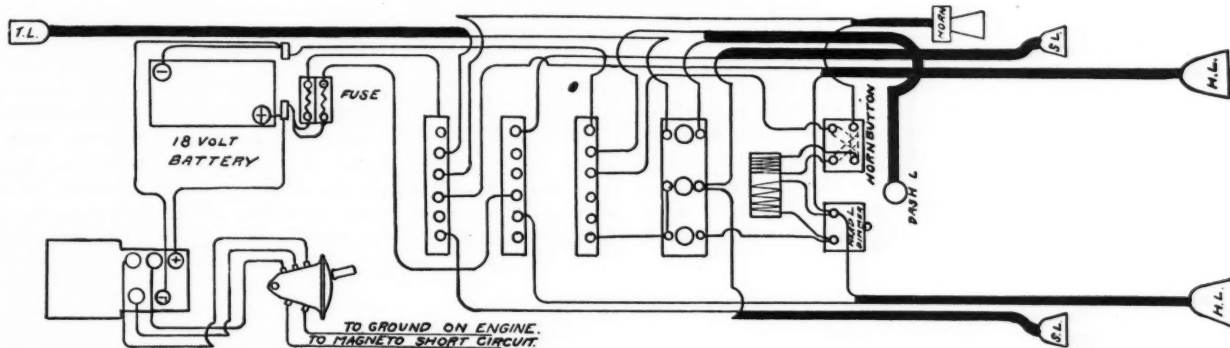
# Motor Age Weekly Wiring Chart No. 55



1915 Dorris using Westinghouse system



1917 Dorris using Westinghouse system



1919 Franklin—Dyneto system

## THIS WEEK 1915 Dorris    1917 Dorris 1919 Franklin

Abbott—March 27, '19  
 Alco—April 24, '19  
 Alter—Nov. 4, '18  
 Apperson—March 6, '19  
 Auburn—Nov. 27, '19  
 Briscoe—Oct. 16, '19  
 Buick—Nov. 21, '18; April 3, '19; Oct. 23, '19  
 Cadillac—Dec. 19, '18  
 Cartecar—May 1, '19  
 Chalmers—Feb. 20, '19; March 27, '19; Nov. 27, '19  
 Chandler—April 3, '19  
 Chevrolet—Nov. 28, '18; March 27, '19  
 Cole—Jan. 23, '19; June 26, '19  
 Crow-Elkhart—June 26, '19  
 Cutting—Nov. 16, '19  
 Daniels—Dec. 4, '19  
 Davis—May 8, '19; Dec. 4, '19  
 Detroit—March 6, '19  
 Dodge—Dec. 12, '19  
 Dort—March 17, '19

Elgin—Feb. 27, '19  
 Empire—March 18, '18; Oct. 30, '19  
 Essex—Oct. 23, '19  
 Ford—Jan. 30, '19; Feb. 6, '19; May 15, 22, '19  
 Franklin—June 19, '19  
 General Battery Charging—May 29, '19; Sept. 25, '19  
 General Magneto Diagram—June 5, '19  
 Grant—Feb. 28, '19; March 27, '19  
 Haynes—Oct. '19  
 Henderson—April 3, '19  
 Hudson—Dec. 5, '18; May 1, '19  
 Hupmobile—Feb. 13, '19; Oct. 16, '19  
 Internal Connections—July 10-17-24, '19  
 Keeton—Nov. 6, '19  
 King—July 6, '19  
 Krit—Feb. 6, '19  
 Lexington—April 24, '19  
 Little—March 20, '19  
 Locomobile—Jan. 23, '19; April 17, '19  
 Maxwell—Jan. 16, '19; Aug. 14, '19  
 Marlon—March 6-20, '19  
 Mercer—Jan. 23, '19; Aug. 28, '19; Nov. 27, '19  
 Michigan—March 20, '19

Mitchell—Jan. 9, '19  
 Monroe—Oct. 30, '19  
 Murray—May 1, '19  
 National—June 19, '19  
 Oakland—Jan. 2, '19; Oct. 16, '18  
 Overland—Nov. 7-14, '18  
 Owen-Magnetic—Sept. 8, '19  
 Packard—June 19, '19; July 31, '19  
 Paige—July 3, '19  
 Paterson—July 9, '19  
 Paterson—March 20, '19; June 20, '19  
 Pierce-Arrow—Oct. 2, '19  
 Premier—April 10, '19  
 Pullman—April 10, '19  
 Regal—Feb. 6, '19; April 10, '19  
 Reo—Feb. 27, '19; Aug. 31, '19; Oct. 9, '19; Nov. 13, '19  
 Saxon—April 17, '19  
 Scripps-Booth—Dec. 26, '19  
 Simplex—April 17, '19  
 Stanley—June 20, '19  
 Stearns-Knight—April 24, '19  
 Studebaker—Dec. 26, '19  
 Stutz—Jan. 23, '19  
 Velle—April 24, '19; Sept. 25, '19  
 Special Systems for Fords—May 15-22, '19

# The Motor Car Repair Shop

## Practical Maintenance Hints

### Reader Suggests Tubular Radiator Repair

EDITOR, MOTOR AGE—Regarding the method of killing a leaking tube, described recently in MOTOR AGE, I would suggest the method of blocking up a tube illustrated should never be used, as both halves of a tube so blocked will contain water which is not in circulation and which will, consequently, freeze and burst the tube again the first time the temperature drops much below freezing.

The proper repair when one wants to cut out a tube is to make holes at the very top and at the very bottom of the tube, as shown at A, as close to the headers as possible, using a prick punch for the purpose. Make a good-sized hole and flow solder into the holes liberally. This is easier to do than the method you illustrate and the job is usually a permanent one.

The method of inserting a good tube inside a burst tube described by you is better in theory than in practice. For one thing, it is not at all easy to find just the right size of tubes for such work and while I have seen this method suggested in print several times, I can say from a rather extensive acquaintance with radiator repair shops, men and methods that it is practically never used.

There is a method of splicing a tube, however, which will probably interest you. This is shown at B. Cut out the offending portion of tube. Select another piece of the tube the same diameter as the piece removed, and slightly longer. Spread one end of the splice tube by reaming

with a punch or any other tapered instrument, and make the other end smaller by making a few short longitudinal cuts in it, then compress the end. Fit the large end of the splice over one end of the tube being repaired, and the other end of the splice into the other part of the tube being repaired. Solder the splice into place.

Another method shown at C is to wrap a piece of light brass or copper around the injured portion of tube so that the edges of the patch or ferrule just meet or fail to do so by a slight margin, soldering it into place. If the tube was previously crushed so badly as to interfere with circulation, this should be remedied before patching.

Where the lateral fins of a tubular radiator of the Ford type have been removed for a repair, a false fin D may be made by folding a  $\frac{3}{8}$ -in. strip of light brass, copper, or even sheet iron longitudinally upon itself to make a double strip  $\frac{3}{8}$ -in. wide. Bridge across the gap in the fin or fins with this painting the patched place the same color as the rest of the core.—A. R. Semple, Chicago.

### Cleaning Auto Window Lights

For many years chemists have sought a cleaning compound which would take dirt and grease off transparent sheeting window lights used in auto curtains without scratching, dulling, or dimming the material. This was not as easy as it might seem at first thought.

However, success has now attended their efforts. After years of experimenting, it occurred to somebody that the

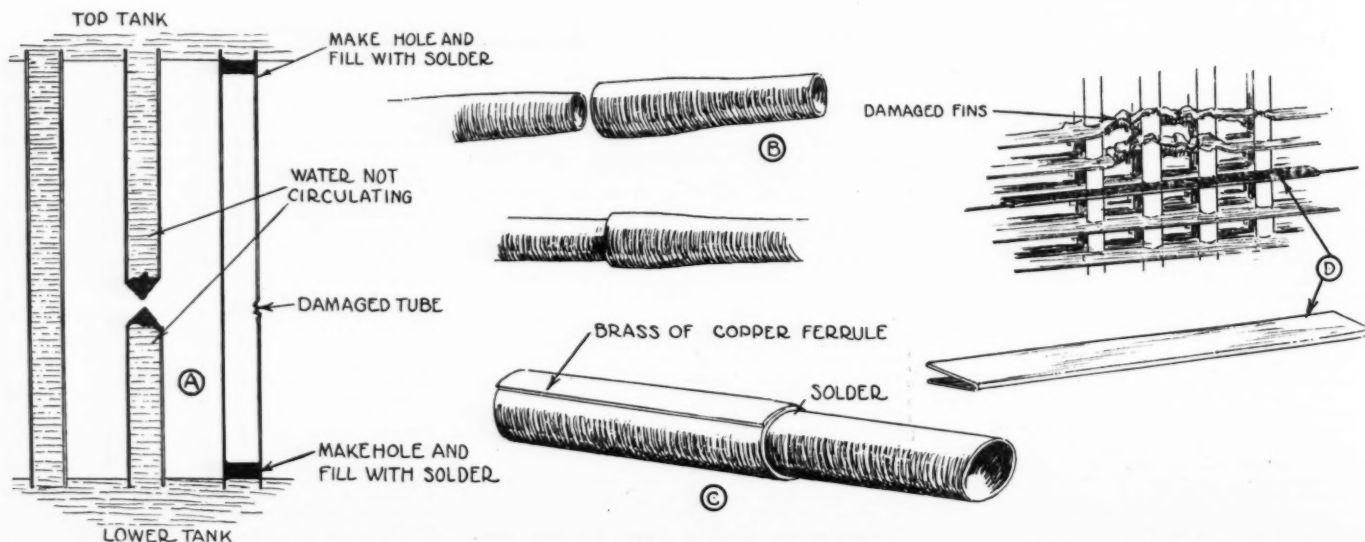
transparent window lights were made of the same material as imitation ivory; therefore, that a cleaning cream designed primarily to clean the imitation ivory would serve the other purpose equally as well.

At present, the cleaning cream is on sale principally in drug and jewelry stores that sell imitation ivory goods, but since it has been discovered that the cream is so well adapted to the cleaning of auto window lights, it is probably only a question of time when it will be found on sale in garages.

### Free Air Hose Support

One of the most objectionable features of the free air business is the misuse and general abuse given the inflation hose by the public. The appreciative motorist is not always the user of the free air service, and others drop the hose on the ground or forcibly bang the hose over a hook provided on a post or a wall.

A good scheme to overcome this difficulty and which also provides a use for an old rim is as follows: The rim is secured to the wall with three or four bent angle iron brackets. The air outlet to the hose is placed near the rim with an elbow on it tangential to the surface of the rim. The hose can then be conveniently looped around the rim. This does not place any kinks or sharp end in the hose and because of this you save the cost of a new hose several times in a year. A neat, attractive sign can be placed in the center of the rim calling the motorists' attention to the fact that the rim is placed there as a holder for the hose.



Several ways of repairing tubular radiator, and method of bridging across fins with bent strip of metal

# Tire and Rim Sizes

Motor Maintenance Data Cost Sheet No. 66

One of a series of weekly pages of information valuable to service men and dealer—Save this page

## 1915 Cars (Continued)

CAR AND MODEL	Make of Tire	Size of Tire	Style of Bead	Type of Rim	Make of Rim
Chevrolet		32x3½		S. S.	Detroit
Cole		34x4	Clincher	Q. D.	Firestone
Corbett, F & E		34x4			
Crawford, 6-35		34x4		Q. D. C.	Firestone
Crow-Elkhart, E 2 & E-45		33x4		Q. D. C.	
Crow-Elkhart, E 52, 54, 55 & 55		34x4		Q. D. C.	
Crow-Elkhart, E-62, 64, 65 & 66		36x4		Q. D. C.	
Cunningham, S.	Opt.	37x5	Q. D.	Demountable	Stanweld
Daniels, A.	Goodyear	{ 32x4½ 34x4½ }	Cord	S. S.	Firestone
Davis, 38-A & 33-E		34x4		S. S.	Firestone
Davis, 6-50		37x4½		Q. D.	Firestone
Detroit, C.		32x3½		S. S.	Detroit
Dispatch		36x3½		Q. D.	Universal
Dodge Brothers	U. S.	32x3½	S. S.	S. S.	Stanweld
	Goodrich				
Dorris, I-A-4 & I-A-5	Goodyear	36x4½	S. S.	Q. D. D.	Firestone
	Firestone				
Dort, 4	Goodyear	30x3	Clincher	Clincher-Dem.	Detroit
Dort, 5	Goodyear	30x3½	Clincher	Clincher-Dem.	Detroit
Empire, 34-40		32x3½		S. S.	Baker
Enger, 6-50		34x4		S. S.	Stanweld
Fiat, 50 & 55		37x5		Q. D. C.	Firestone
Firestone-Columbus, 82-E & 86-E		34x4			
Firestone-Columbus, 90-E & 98-E		36x4½			
Ford		30x3½	Clincher	Clincher	Ford
Franklin, M-7 & 8	Goodyear	34x4½	S. S.	No rim cut	Goodyear
				Detachable	
F. R. P., 45-B		36x5		Clincher	Wire Rudge
Glide, 30	Goodyear	32x4	S. S.	Demountable	Detroit
Glide, 6-40	Goodyear	34x4	S. S.	Demountable	Goodyear
Grant, M		28x3			Firestone
Grant, T		30x3½			
Great Western, A		36x4			
Great Western, B		34x4			
	U. S.				
Haynes, 30-33	Firestone	34x4	S. S.	E light	Firestone
	Goodyear				
Herff-Brooks, 4-40	Goodyear	34x4	No-rim-cut	Demountable	
Hudson, 6-40		34x4			Kelsey
Hudson, 6-54		36x4½		S. S.	Stanweld
Hupmobile, K	Goodyear	34x4	S. S.	Demountable	Kelsey
Imperial, 64		32x3½			
Imperial, 56		36x4½			
Inter-State		33x4		S. S.	Firestone
Jackson, Olympic		34x4		S. S.	
Jackson, 6-48		34x4½		S. S.	
Jeffery, 104		34x4		S. S.—Clincher	Funk
Jeffery, 96-106		34x4½		S. S.—Clincher	Funk
Kearns		28x3		Clincher	
King, D	Goodyear	33x4	Non-skid	Demountable	Stanweld
	Firestone				
Kissel Kar, 4-36		34x4		S. S.	Stanweld
Kissel Kar, 42		35x4½		S. S.	Stanweld
Kissel Kar, 6-48		36x4½		S. S.	Stanweld
Kissel Kar, 6-60		37x5		S. S.	Stanweld
Klinekar, 6-42-D	Goodyear	34x4	S. S.	E	Firestone
Klinekar, 6-42 A-D	Goodyear	35x4½	S. S.	E	Firestone
Krit, O & M		32x3½			
Lambert, 48-C		32x3½			
Lambert, 68-C		34x3½			
Lenox		34x4½		S. S.	Firestone

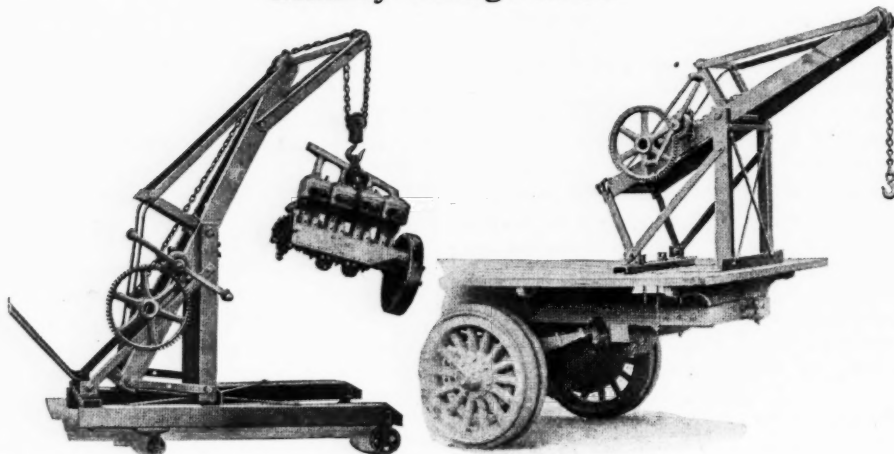
### ABBREVIATIONS:

S. S.—Straight Side. Q. D. C.—Quick Demountable Clincher. Dem.—Demountable. Q. D. D.—Quick Demountable Detachable.

# Service Equipment

## Time Savers of the Shop

### Manley Garage Crane



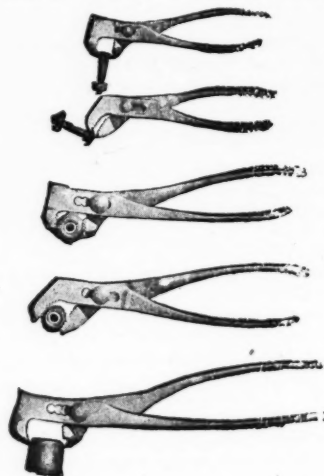
Manley garage crane, which can be used as a wrecking crane on a truck, or as a portable crane on floor for inside and outside work

Here is a general utility garage crane which can be used for a great many different purposes in the service station business. Because of its portability it can be used as a wrecking crane on a truck with the beam mounted on any desired angle; or as a portable floor crane for both inside and outside purposes. The crane can be

dissembled in a few minutes' time, loaded on a small service station car and carried to the scene of action. The capacity of this crane when used on the floor of the garage or service station is 1½ tons, and when used as a wrecking crane is 2 tons. This crane is made by the Manley Mfg. Co., York, Pa.

### Eagle Claw Wrench

The Eagle claw wrench is a very handy tool for the garage man to have in his pocket. It has a variety of uses as the illustration shows. The adjustable feat-

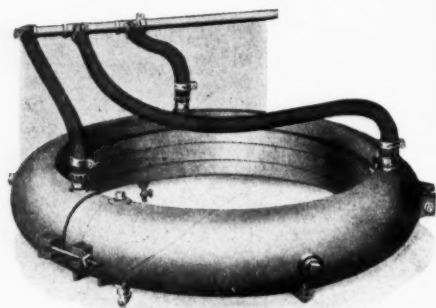


A fine set of Eagle claw wrenches

ure makes it adaptable to four different sized nuts and other fittings to be gripped. It has a pipe gripping feature which makes it unnecessary to chase all around the shop looking for a Stillson wrench. The sole distributors for this article are Jessop & Thompson, Chicago.

### Vulcan Retread Mold

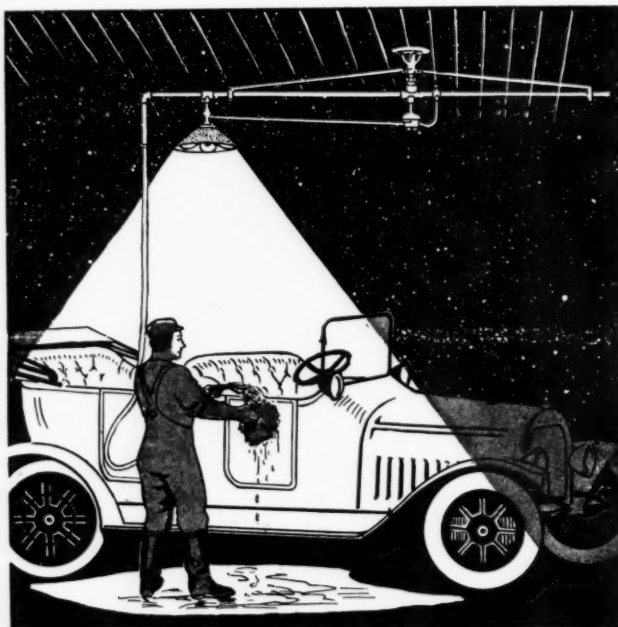
The vulcan retread mold is of the type that cures the tire in one heat. In other words it is a full circle retreader. This construction does away with the overheating possibilities at the lapping sections of



Vulcan retread mold, a full circle retreader

the more common one-third circle retreading machines. The complete equipment consists of four vulcan flexible molds, the boiler and its fittings, table, and a hose. With this equipment it is possible to cure at least fourteen different sizes of tires. This mold is made by the A. B. Legnard Co., Waukegan, Ill.

### Rhodes Vehicle Washer



Rhodes overhead vehicle washer

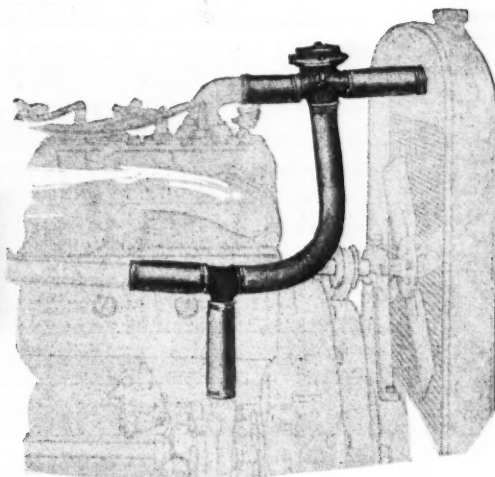
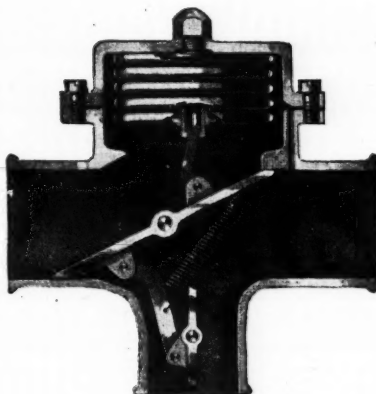
This is an overhead washer for use in the garage. Because of the overhead arrangement and the freely swinging arm of the washer only a short piece of hose is needed. The arms extend 4½ ft. from the center, thus giving a 9-ft. circle which is large enough to meet the washing requirements of any car. The "Superior" model is equipped with a shielded dome which illuminates the work. This light travels with the arm and thus makes it unnecessary to light up the whole garage in order to see all sides of the car.

# The Accessory Corner

## New Fitments for the Car

### Rayfield Thermostat

THE Rayfield Thermostat was designed by Charles Rayfield, inventor of the Rayfield carburetor, for use with internal combustion engines to meet present day low grade fuel conditions. The thermostat provides a by pass for the cooling water which is operative when the engine temperature is low. When the by pass valve is open the water instead of circulating through the radiator is returned directly to the engine. When the engine temperature reaches 170 deg. this valve closes and the water is then forced to go through the radiator. This radiator is manufactured by Beneke & Kropf Mfg. Co., Twenty-first and Rockwell street, Chicago.



Sectional and installation view of Rayfield Thermostat now on market for replacements

### Zig-Zag and United Piston Rings

Both of these rings are new products. The Zig-Zag is a concentric ring with a double step joint cut zig-zag. The United is of the same general type as the

Zig-Zag except that the joint is of different design, being of the closed form. Both these rings are manufactured to close limits and are supplied in indi-

vidual packages. The price of the former is 50 cents and the latter \$1. McQuay-Norris Mfg. Co., St. Louis, Mo.

### Hi-Speed Piston Ring

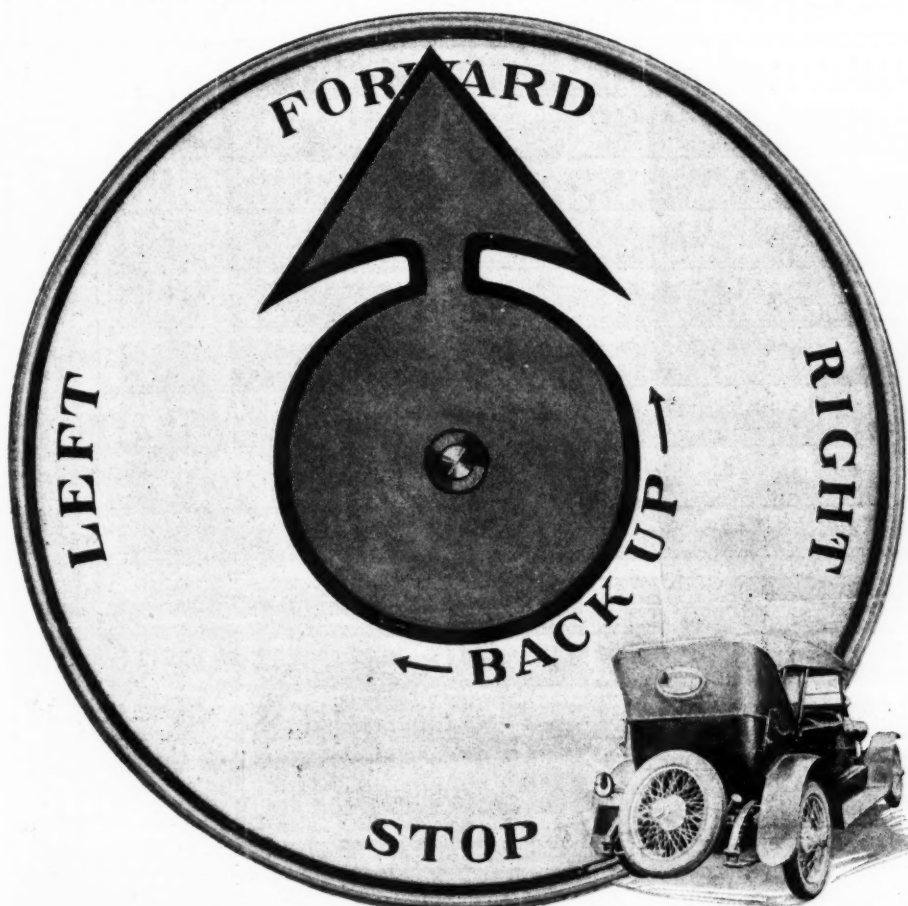
This is a concentric ring with a step cut joint made from gray cast iron. It is claimed that the diagonal step cut joint forces the ring to travel spiral wise in the ring groove preventing the ring from sticking or scoring the cylinder. These rings are available in oversizes from .005 to .060 in steps of .005. Continental Piston Ring Co., Memphis, Tenn.

### Wright Traffic Signal

The Wright traffic and danger signal is a noteworthy attempt for the elimination of motor car accidents. This device is placed upon the rear of the car. A large arrow very distinct and red in color is movable and is controlled by a button at the will of the driver. It signals all five movements of the car, namely: forward, reversed, and stop; right and left turns. At night time the tail light of the car is always lit and advantage of this is taken for the illumination of the signal. The signal is made by the Wright Traffic Signal Co. Cincinnati, Ohio.

### Wonder Worker Flash Starting Fluid

This is intended to facilitate starting on cold days. The fluid is made from special oil distillations to flash 20 deg. below zero. This is considerably below the ignition point of gasoline hence only a very small amount of the fluid injected into the manifold or cylinder will assist in starting. Price, ½-pint cans, 50 cents. The Hall-Thompson Co., Hartford, Conn.



Wright traffic and danger signal designed to fasten to rear fender of car. Arrow indicates direction of travel

# Motor Age Monthly Guide to Truck Specifications

These tables are revised and brought up to date monthly

Name and Model	Tons Capacity	Chassis Price	Front Tires	Rear Tires	Name of Engine	No. Cyl. Bore	Ignition	Electric Lighting	Governor	Carburetor	Clutch	Gearset	Final Drive	Axle	Steering Gear
A. A. & B., 3T.	1	45-32 1/2	45-32 1/2	45-32 1/2	Own	4 5 17x4	Bosch	none	none	Schob.	none	own	in-g.	own	Ross
A. A. & B., 5T.	2	45-34 1/2	45-34 1/2	45-34 1/2	Wauk.	4 5 17x4	Bosch	Nite.	Wauk.	Schob.	none	own	in-g.	own	Ross
Asaeson, H.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, L.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, M.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, N.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, O.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, P.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, Q.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, R.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, S.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, T.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, U.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, V.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, W.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, X.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, Y.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, Z.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, AA.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, AB.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, AC.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, AD.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, AE.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, AF.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, AG.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, AH.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, AI.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, AJ.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, AK.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, AL.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, AM.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, AN.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, AO.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, AP.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, AQ.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, AR.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, AS.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, AT.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, AU.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, AV.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, AW.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, AX.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, AY.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, AZ.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, BA.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, BB.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, BC.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, BD.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, BE.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, BF.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, BG.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, BH.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, BI.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, BJ.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, BK.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, BL.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, BM.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, BN.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, BO.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, BP.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, BQ.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, BR.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, BS.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, BT.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, BU.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, BV.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, BW.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, BX.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, BY.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, BZ.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, CA.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, CB.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, CC.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, CD.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, CE.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, CF.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, CG.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, CH.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, CI.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, CJ.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, CK.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, CL.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, CM.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, CN.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, CO.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, CP.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, CQ.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, CR.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, CS.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, CT.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, CU.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, CV.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, CW.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, CX.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, CY.	3	36x5	36x5	36x5	Wauk.	4 4 15 1/2	Eise.	Nite.	Wauk.	Schob.	B.B.B.	Cotta	own	own	Ross
Asaeson, CZ.	3	36x5	36x5	36x5	Wauk.	4									

**Abbreviations:** Engine—Wauk., Waukesha; Cont., Continental; H-S, Herschell-Spillman; Lye., Lycoming; N.A., North American; Herc., Hercules; Mil., Milwaukee; Wis., Wisconsin; Lo.R., LeROI; GBS, Golden, Belknap & Stewart; Beav., Beaver, Ignition—Eise., Eichenmann, A-K, Atwater Kent; Koko, Kokomo; Spit., Splitdorf; Conn., Connecticut; Launr., Lauring; A-L, Auto-Life; Ducto, Dyneco; Al-Ch., Alfa-Chimere; Wat., Waterhouse; L-N, Leesville; Det., Detroit; N.E., North East; Wag., Wagner; Asterisk, electric starting also. Governor—Wauk., Waukesha; Dupl., Duplex; Cont., Continental; Mon., Monarch; Simp., Simplex; McCann, Ruggles, Carbureter—Schub., Schieber; Stromberg, Ray, Rayfield; King, Kingston; Mon., Monarch; Shakespear, Kay, Carter Fleck Fletcher; Holl., Johnson; Stew., Stewart; Trill., Tilloston; Asternak, vacuum fuelled. Clutch—B.K.B., Borg & Beck; B-Lipe, Brown-Lipe; Dnt., Detroit; H-Shaw, Hele-Shaw; Mech., Mechanics; Cover, Cover; Savg., Savage Arms, W.G.C. Co., Warner Gear Co., Final Drive—in-g., internal gear; ext-g., external gear; s-b-v., spiral bevel; d-d-l., double reduction; Axle—Timko, Timken; Key-H., Keystone-Hindley; Sic., Sheldon; Salsbury, Ind., Industrial; Chgo., Chicago. W.G.C. Co., Warner Gear Co.

**Final Drive**—Emp., Empire. Steering Gear—Gag., Gaggen. Steering Gear—W.W. Walker-Vaisey. Emp., Empire. Tires—Asterisk, pneumatic.

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## Motor Age Monthly Motor Truck Specifications — Concluded

[illegible][illegible]

[illegible]

# Among the Makers and Dealers

## Short Trade Notes

**Benell New Haynes Manager**—J. A. Benell, formerly special representative for the Haynes Automobile Co., Kokomo, Ind., is now assistant general manager of the company. Soon after Mr. Benell was called from the road to assume duties at the Haynes factory, he was made assistant to Vice President and General Manager Seiberling.

**Pierce Stops Night Work**—The Pierce-Arrow Motor Car Co. has discontinued the operation of the night force at its Buffalo plant. An announcement of the company says it is able to care for its present orders by operations of a day force. Places have been found for workers heretofore employed at night on the day shift.

**Wagon Man Rewarded by French Government**—R. V. Board, president of the Kentucky Wagon Mfg. Co., a "dollar-a-year man" during the war, who settled a claim for the French Government amounting to several million dollars, has been presented by the French Republic with a gold watch bearing on its back the inscription "Many thanks from the French Government, 1918." Mr. Board refused to accept a money reward although he was told that he might name his own amount.

**Wisconsin Parts Enlarges**—Increased demand has forced the Wisconsin Parts Co., makers of Wisconsin worm drive axles, to enlarge its facilities. The company is to build a plant 240 ft. in length.

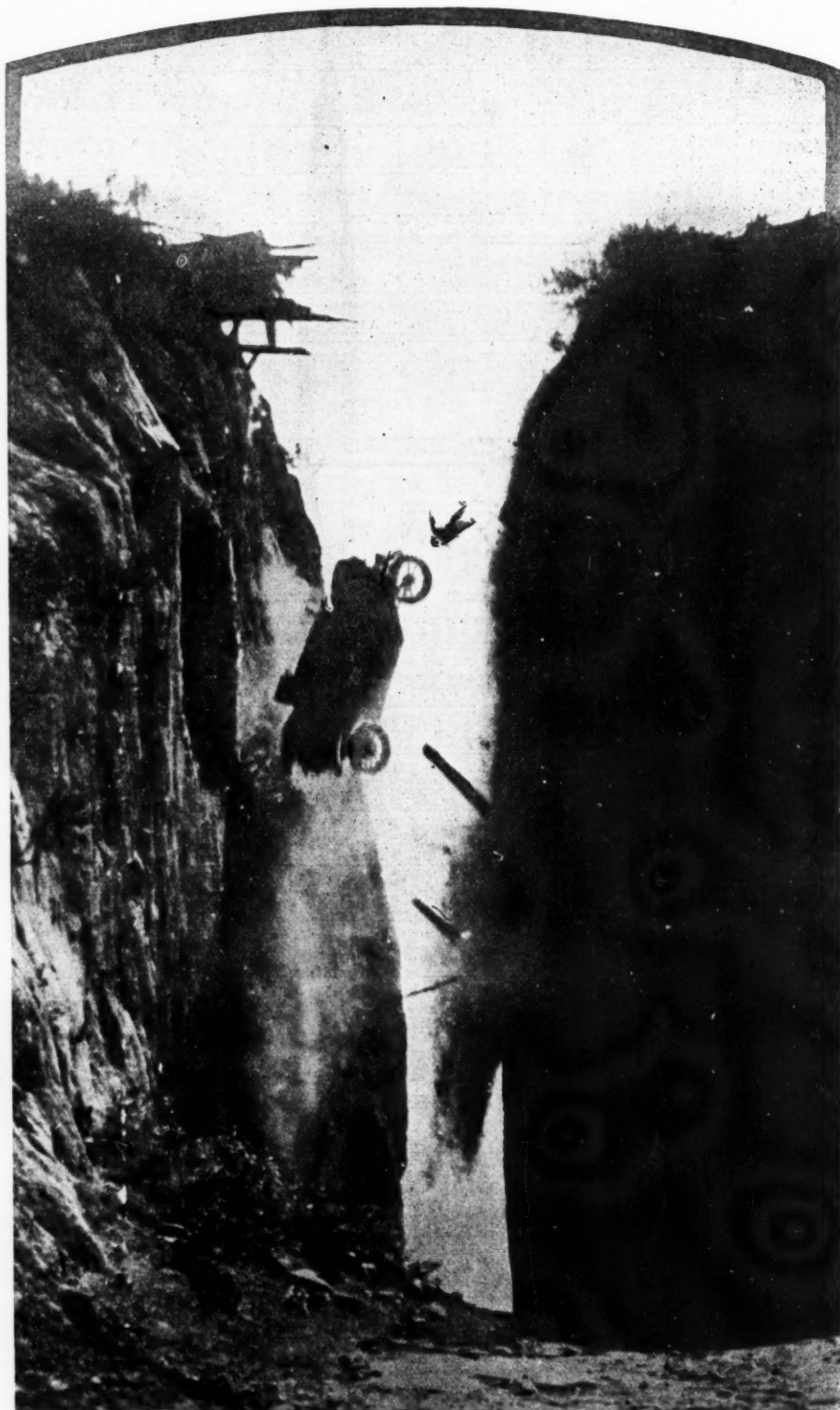
**Clayton Carbureter Vice President**—W. Earle Clayton has been elected vice president of the Lacarney Carbureter Co. He is also vice president of the Lyons Ignition Co., American manufacturers of the Joly spark plug.

**Announce Premier Production**—A new schedule of production has been laid out by L. S. Skelton, new head of the Premier Motor Corp. The plant will turn out 5000 cars in 1920 if the present plans materialize. This is 2000 more cars for the year than was announced by the company a short time ago. All of the creditors have been paid off in full. The following personnel of the company was announced in addition to L. S. Skelton, president; Frederick P. Nehrbas, vice president and general manager; Charles S. Crawford, vice president in charge of engineering; George A. Barr, secretary, and I. F. Schaeffer, treasurer.

**Lafayette Officers Named**—The Lafayette Motor Co. of Indianapolis has announced the complete roster of its officers as follows: Charles W. Nash, president; J. J. Storrow, chairman of board of directors; D. McCall White, vice president; E. C. Howard, vice president; W. J. Moore, secretary-treasurer.

**Lang Now District Tire Manager**—Philip H. Lang, who a year ago was promoted from Pittsburgh branch manager to New York branch manager for the Empire Rubber & Tire Co., Trenton, N. J., has been made district manager. He has been with the Empire company for several years.

### A Thriller Not on the Bill



An English movie concern attempted a "stunt picture" with an automobile leaping a deep chasm but the car refused to go all the way with this disastrous result

together with one share of common stock in the new company for each share in the present corporation.

**Ground Broken for New Cleveland Factory**—Ground for a new plant for the new plant for the Cameron Motor Car Co. has been broken and production will begin as soon as the buildings can be constructed.

**Vickers Finances Chinese Sale**—The Vickers Co., British airplane manufacturers, has arranged to lend the Chinese government \$45,000,000 at 8 per cent to be used to purchase airplanes, hangars and parts from the company.

**Tractor Plant Moved to Decatur**—The Dual Truck & Tractor Co., Decatur, Ill., has purchased the business and equipment of the Jefferson Tool & Machine Co., Chicago, and the machinery has been removed to Decatur.

**Kroh Takes Cadillac Service Station**—Henry A. Kroh, for many years southeastern district mechanical inspector for the Cadillac Motor Car Co., and later with the Lincoln Motor Co., has resigned to take charge of the new service station at the Cadillac agency in Charleston, S. C., as service manager.

**To Start Rural Freight Line**—A ship-by-truck line from Toledo to Detroit will begin operations Nov. 1, a fleet of Standard Motor Truck Co.'s trucks having been purchased by W. F. Bowman and C. A. Miller for use in the freight service. It is planned to expand the business to cover all territory adjacent to Toledo.

**G. M. C. Builds for Workers**—Living quarters for 1800 families will be ready for occupancy Jan. 1 as a result of the efforts of the General Motors Corp. to relieve the housing situation in Flint, Mich. More than 200 new homes have been completed by the DuPont Engineering Co., and 4000 men are rushing the others to completion. The estimated cost of the project is \$6,000,000.

**Oldsmobile Plant Enlarged**—The Oldsmobile unit of the General Motors Corp. this week began the construction of a new four-story office building at Lansing, Mich., of brick and concrete, 50 by 300 ft. to house the officials and three hundred clerks. A garage 50 by 120 ft. will be erected adjoining the administration building with storage space for 30 cars.

**Parenti Gets Many Orders**—Announcement that orders for 10,000 cars have been booked by the Parenti Motor Corp. has just been made by J. S. Parenti, president of the firm, which will begin the manufacture of a new car in Buffalo about Jan. 1. The firm has opened temporary offices in Buffalo, and is planning to make first deliveries about Jan. 1. Lieut. Dion Parenti of the Parenti-Bissi company of Italy is in Buffalo assisting in organization of the company. The firm announces it will shortly begin operation in Buffalo and expects immediate production of machines on a large scale.

**Reo Sets Production Mark**—With 100 trucks turned out in one day, the Reo Motor Car Co. recently established what is believed to be a record for a nine-hour working day for any single truck model. Sustained effort to meet the demand for the truck, rather than a desire to establish a record was responsible for the result. Despite the increased facilities the company is far behind orders and further additions to meet the growing business are contemplated. The freight car shortage has not interfered with delivery, fleets of speed

wagons going over the road to the far south, the New England states and into Canada.

**Rickenbacker Quits Racing**—Capt. Eddie Rickenbacker has made no definite plans for the future except to announce that he is through with automobile racing and flying and intends to devote the rest of his life to a business career.

**Portage Rubber Pays Dividend**—The Portage Rubber Co. has authorized the payment of its regular 3 per cent quarterly dividend on common stock of record Nov. 5, payable Nov. 15. The construction of a three-story addition to the factory was also authorized. This will be of reinforced concrete and will cost approximately \$200,000.

**Columbus Gets New Tractor Branch**—The Emerson-Brantingham Implement Co. announces the establishment of a Columbus, Ohio, branch. Columbus has been maintained as a sub-branch for a number of years, but has been under the direct supervision of the Indianapolis branch; consequently there has been some delay in the handling of business, which has not always been pleasant to the trade.

**Packard to Increase Truck Output**—Nearly \$1,750,000 is being invested by the Packard Motor Car Co. in order to increase production in its truck building department. A large manufacturing unit is now in process of construction and will be completed soon. This addition is a three-story building having a floor space of 250,000 sq. ft. The Packard company is now running approximately 25 trucks a day and is aiming to run production up to 1000 trucks a month.

**New Machinery for Chevrolet**—The Chevrolet Motor Co.'s plant in this city has been fitted with \$100,000 worth of new machinery, replacing that used in war work, and a number of men will be added to the payroll. The plant is operating 22 hours a day and has steel on hand to last 60 to 90 days. Included in the new machinery are six 14-ton automatics accommodating 1600 pounds of steel at one time. The plant is being remodeled throughout to meet the greatly increased schedule.

**To Centralize Canadian Accessory Trade**—General Motors, Ltd., organized with a capital of \$200,000, will locate at Regina, Sask., where it is the intention to centralize the automobile accessories industry of western Canada, in charge of a staff of experts. A. B. Cook, former president of the Saskatchewan Motor Co., heads the new organization and A. J. Gibson, former manager of the Motor Sales Corp., Ltd., of Regina, is managing director. Announcement of the plans of the organization was made in Detroit this week.

**Standard Oil Enlarges Milwaukee Plants**—Plans have been made public by the Standard Oil Co. of Indiana by which Milwaukee is to be made one of the most important distributing centers in the central west. The company has purchased a site for a 12-story headquarters building, 120 by 120 ft., costing \$1,000,000. Excavation is under way. In addition, the purchase was made during the week of an 8½-acre tract on the Kinnickinnic river, for \$150,000. On this site the company proposes to expend \$1,000,000 for warehouses, tank storage, dockage, etc. The present main warehousing group will be moved to the new site. R. G. Stewart has recently assumed the position of manager at Milwaukee, this being a development of a district branch managerial post

at this point. Mr. Stewart is authority for the statement that \$300,000 has been invested in Milwaukee real estate in the last two or three months, and a prospective expenditure of approximately \$2,000,000 in buildings and equipment.

**Gabriel Increases Output**—The Gabriel Mfg. Co., Cleveland, has just completed an addition to its factory, increasing its capacity to 1200 sets of snubbers per day. They report that snubbers are now standardized by 25 motor car builders.

**Soft Pedal Co. Incorporated**—The Williams Soft Pedal Co. of Cedar Rapids, Iowa, has incorporated for \$100,000, paid up capital being \$35,000. It is at present manufacturing the Williams Soft Pedal and expects to manufacture several other devices in the future. A. A. Williams is president, E. Kullberger, vice-president, at present connected with the Cedar Rapids Buick Co., H. G. Miller, treasurer, formerly a Cedar Rapids Buick dealer.

**McNaull Tire Co. Is Sold**—The McNaull Tire and Rubber Co., a new \$1,000,000 concern, has purchased the plant and other property of the defunct McNaull Tire Co., and will reopen the factory for the manufacture of tires. Improvements to increase the daily capacity from 200 to 500 tires are contemplated. The consideration was \$300,000, to be paid in 90 days, with a cash payment of \$40,000. Creditors of the defunct company, headed by F. R. Henderson, rubber importer of New York, who held a claim of \$75,000, are interested in the new concern.

**Opens New Service Plant**—The B. L. P. Motor Co., Inc., Philadelphia, distributor in that district for the Premier motor car and Denby and Duplex trucks, on Jan. 1 will move into a large new sales and service building. There it will have a fully equipped machine and repairshop on the ground floor, which will include the latest in drill presses and lathes, shapers and other machines for maintenance and repair. The sales and mechanical force will be largely increased under the new conditions.

**Harrisburg Firestone Men in Meet**—The fourth annual dinner and meeting of the Harrisburg branch of the Firestone Tire & Rubber Co., was held in Harrisburg last week. All branch employees and numerous service men, and dealers from surrounding towns attended the event which was in the nature of a "ship-by-truck" boosters' meeting.

**Louisville Gets Tire Plant**—Louisville is to have a tire and tube manufacturing plant which is to cost \$250,000 and will employ 300 men according to W. R. White of Cleveland, a representative of the Kentucky Tire & Rubber association who has been looking over the ground with a view of selecting a site for the plant. The association is incorporated under the laws of the state of Delaware.

**Massis Heads Oldfield Tire Co. in Chicago**—P. C. Massis has been appointed manager for the Oldfield Tire Co. with headquarters in Chicago. R. R. Colby, formerly of Los Angeles, will assume the San Francisco managership made vacant by the transferral of Mr. Massis.

**Wilmington to Be Represented at New York**—For the first time, Wilmington, Del., is to be represented in the New York Automobile Show this year. The city will be represented by the exhibition of two cars built by the new duPont Mfg. Co. of Wilmington, the first manufacturer of automobiles in the Delaware city.

# From the Four Winds

## Glimpses at the World of Motordom

**Hartford (Conn.) Has Public Parking Space**—Hartford has provided a public parking space for automobiles along the east bank of the Park river, where cars may be left as long as the owners desire. Agitation favored patrolling by the police of this section in order to keep marauders away but the police department did not view matters in the same light. However, two old-timers thought they saw a chance to make a little money and voluntarily patrolled the long stretch. They left circulars in the cars calling the attention of owners to the fact that they were working for their interests and were not being compensated by the city; therefore they relied upon the generosity of the car owners. It proved to be pretty poor picking, and as one of the men expressed it, they got but \$25 in three weeks, which barely provided them with grub money. Nothing had been taken from cars and no cars were stolen while the men were on duty.

### Marshall Haig's Field Car



The car used by Field Marshall Haig, commander of the British Armies in the field during the latter stages of the Great War, recently was put on auction in London. The above is an interior view of the car, showing how it was fitted up as an office on wheels.

### Coming Motor Events

#### SHOWS

Paris, France.....	Aeronautic Industry Show.....	Dec. 19 to Jan. 4
New York .....	N. A. C. C. ....	Jan. 3 to 10
Chicago .....	Aeronautic Show.....	Jan. 8 to 14
Montreal, Que.....	Automobile Show .....	Jan. 10 to 17
Philadelphia .....	Automobile Show .....	Jan. 10 to 17
Philadelphia .....	Truck Show .....	Jan. 17 to 24
Cleveland, Ohio .....	Automobile Show.....	Jan. 17 to 24
Hartford, Conn.....	Automobile Show .....	Jan. 17 to 24
Spokane, Wash.....	Automobile Show.....	Jan. 21 to 25
Chicago .....	N. A. C. C. ....	Jan. 24 to 31
Chicago .....	Automobile Salon .....	Jan. 24 to 31
Minneapolis-St. Paul.....	Automobile Show .....	Feb. 9 to 14
Toledo, Ohio.....	Automobile Show .....	Feb. 2 to 7
Cedar Rapids, Iowa.....	Twin Cities Show .....	Jan. 31 to Feb. 7
Kansas City .....	Automobile Show .....	Jan. 31 to Feb. 6
Brussels, Belgium.....	Motor Show.....	January
Wichita, Kan.....	Wichita Thresher Tractor Club.....	Feb. 9 to 11
Kansas City, Mo.....	Kansas City Tractor Club.....	Feb. 16 to 21
Louisville, Ky.....	Automobile Show .....	Feb. 2 to 5
St. Louis .....	Automobile Show .....	Feb. 15 to 20
Montreal, Que.....	Dealers' Show .....	Feb. 16
Portland, Ore.....	Automobile Show.....	Feb. 23 to 28
Buffalo, N. Y.....	Dealers' Show .....	February
Lyons .....	Automobile Show .....	March 1 to 8
Boston, Mass.....	Automobile Show .....	March 13 to 20
New Orleans, La.....	Fashion Show .....	March
Jersey City, N. J.....	Automobile Show.....	March
Little Rock, Ark.....	Automobile Show .....	March 15
Wilkes-Barre, Pa.....	Automobile Show .....	Mar. 15 to 22

#### CONVENTION

Wichita, Kan.....	Kansas Dealers' Convention.....	Dec. 10
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### THE MOTORIST'S TEN COMMANDMENTS

The Cobourg, Ont., Motor Club recently awarded first prize to Beulah Garland, aged 11 years, for the best essay on "How Children May Help to Avoid Motor Accidents." The essay was in the form of ten commandments, which are as follows:

- 1—Thou shalt not play upon the street.
- 2—Thou shalt not cross the street, only at crossings as there thou hast the right-of-way.
- 3—Thou shalt look before crossing the street.
- 4—Remember, after getting out of a car, thou shalt not cross the street behind a car.
- 5—Thou shalt not get in or out of a car when it is moving.
- 6—Thou shalt not interfere with cars as thou may'st put them out of order and cause accidents.
- 7—Thou shalt not drop nails, glass, or pins upon the road and cause motorists to have blow-outs and perhaps accidents.
- 8—Thou shalt not light matches near gasoline.
- 9—Thou shalt keep the motor rules when riding on a bicycle.
- 10—Thou shalt help old people across the street.

**Most of Iowa Traffic Motorized**—Eighty-two per cent of the road traffic over the primary road systems of Iowa is motor-driven, according to figures given out by the state highway commission, which has been making observations. The figures were arrived at after observations made at eighty-seven stations in thirty-six counties of the state and the count is believed to be fairly representative of the entire main highway system of the state.

**Ship Trucks South By Barges**—Truck manufacturers are resorting to the government owned barge lines operating on the Mississippi to supply trucks to their southern dealers. The service is about 40 per cent cheaper than railroad freight rates and in addition the manufacturers are able to get space on the barges when no railroad cars have been available.

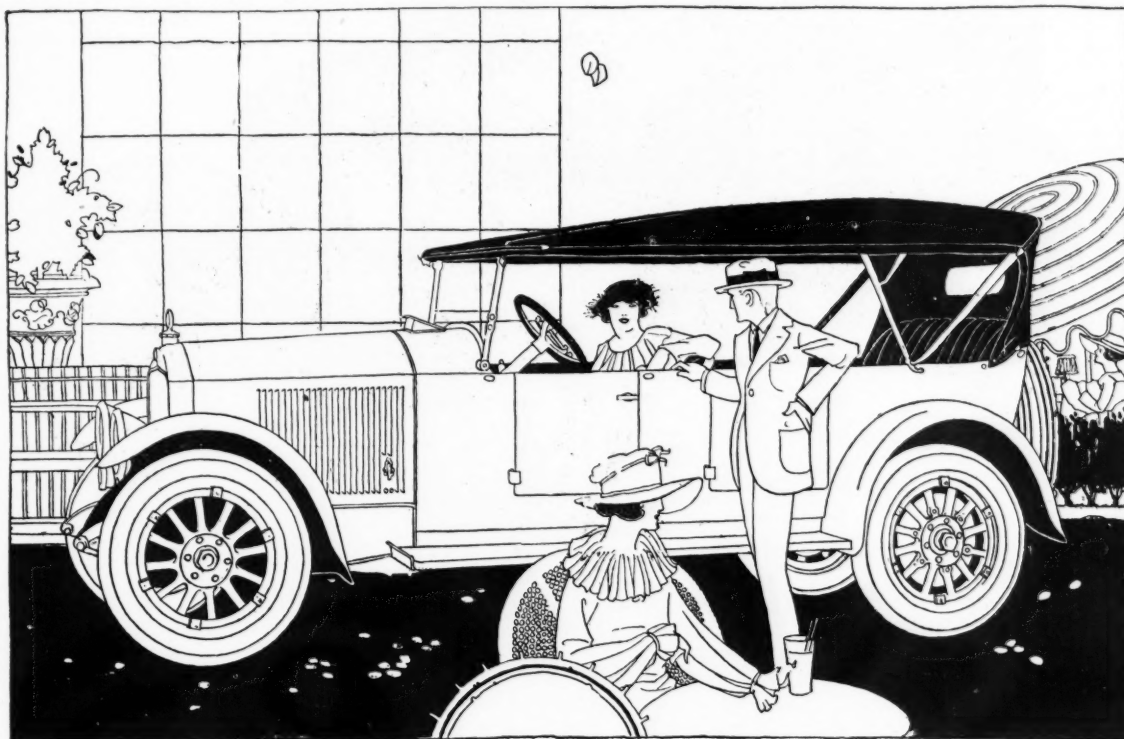
**Canada Plans Landing Fields**—Mayors of cities on the Canadian side of the Niagara frontier have been asked to consider the establishment of municipal landing fields and airdromes. Niagara Falls and Thorold, Ont., are two cities which are giving serious consideration to the proposal suggested by the Aero Club of Canada.

**Wilmington Plans for Show**—While no definite arrangements have yet been made, it is understood the Hotel duPont will be the site of the 1920 Wilmington motor show. The show was suspended last year on account of war conditions.



National

THE NATIONAL SEXTET IS BUILT IN FIVE CUSTOM BODY STYLES



THE NATIONAL SEXTET SEVEN-PASSENGER TOURING CAR

## Descendant of the First American Six

It is logical to believe that the engineers who built the first American six-cylinder car in 1905, and who continued to develop sixes without interruption for fourteen successive years, should be most competent to perfect an engine of this type.

The newest National—the road hugging, smartly continental Sextet—is offered, without reservation, as proof of such competency.

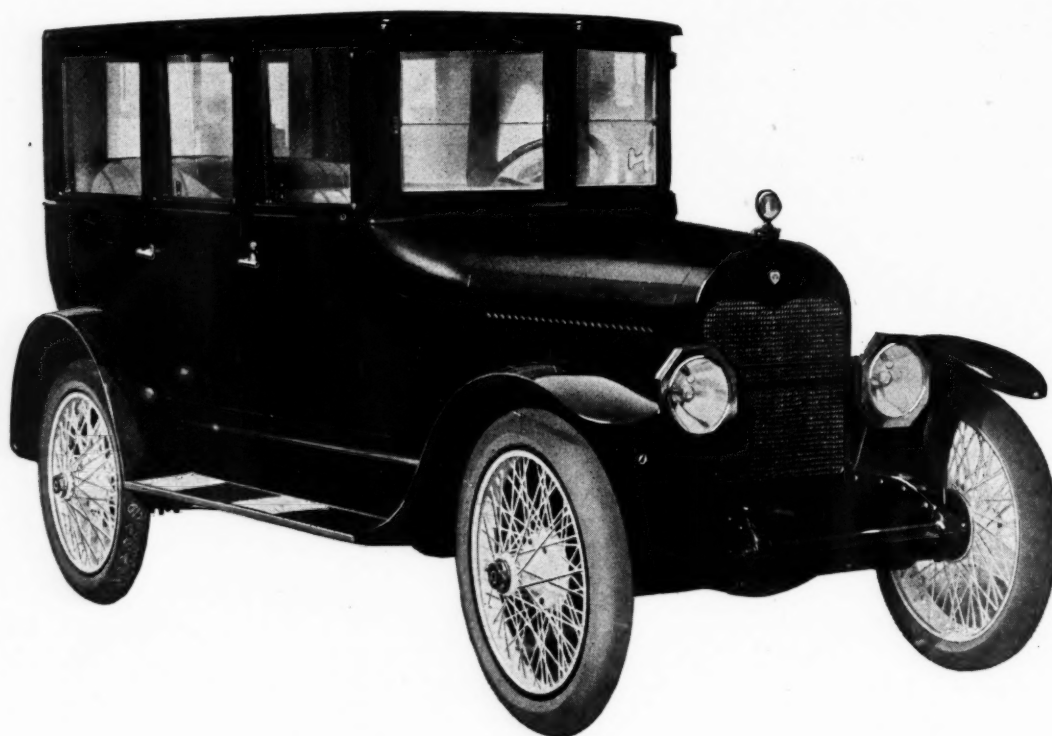
The capable and rugged engine of the National Sextet, in fact, marks a distinct advance in the science of motor development.

It embodies all the latent possibilities of the six-cylinder power plant, developed and perfected through two years of tireless concentration, exacting test and continual improvement.

Measured by the standards that determine the true worth of any engine—power and economy, slow speed performance and instantaneous pickup, resistance to wear and its corollary, freedom from trouble, and, finally, absence of noise and vibration—the engine of the National Sextet establishes a level of motor excellence exceptionally high.

NATIONAL MOTOR CAR & VEHICLE CORPORATION, INDIANAPOLIS

*Twentieth Successful Year*



The new Crow-Elkhart Sedan affords the prideful ownership of a smart enclosed motor car at a surprisingly low maintenance cost. The correct distribution of the body weight upon the chassis lightens the tire-burden; the frugality of the multi-powered motor insures every atom of power from each gallon of gasoline.

Dealers instantly realize the selling possibilities of the beauty, power and economy of the Crow-Elkhart models. Write today for informative catalog and dealer proposition.

**CROW - ELKHART MOTOR CORPORATION**  
Dept. 101 ELKHART, INDIANA

# CROW-ELKHART

## *Multi-Powered*

# MICHELIN

## AN OPPORTUNITY

Notwithstanding the popularity of Michelin Tires, there are some towns where dealers can still secure this valuable account.

In these towns we offer the following:



1st—A thoroughly tested cord tire, made by the oldest pneumatic tire maker in the world.

2nd—A fabric tire of unsurpassed quality sold at a moderate price.

3rd—The only ring-shaped tube on the market—a tube that sells itself.

4th—One of the biggest and most impressive tire and tube advertising campaigns ever conducted.

5th—Special sales helps for individual dealers.

We invite you to write us now

# MICHELIN TIRE COMPANY

Milltown, New Jersey

In beauty, Hayes Wire Wheels add to any car a percentage too great to be overlooked by those who take pride in car-smartness.

So it was to be expected that the first preference for wire wheels would be shown by owners of the costlier types.

But no less astonishing has been the general vogue of Hayes Wire Wheels among cars of all types and makes.

A great majority of car manufacturers specify Hayes as their wire wheel equipment.

Furthermore, literally thousands of owners have elected to change over to Hayes Wire Wheels.

*These simple facts constitute the reasons why Hayes Wire Wheel dealerships are being rapidly taken by the better accessory and special agencies. There may be an exceptional opportunity in your city*

**Wire Wheel Division**

**Hayes Wheel Company, Jackson, Mich.**

**World's Largest Builders of Wheels—Wire, Wood, Steel**

**Sales and Service Stations:**

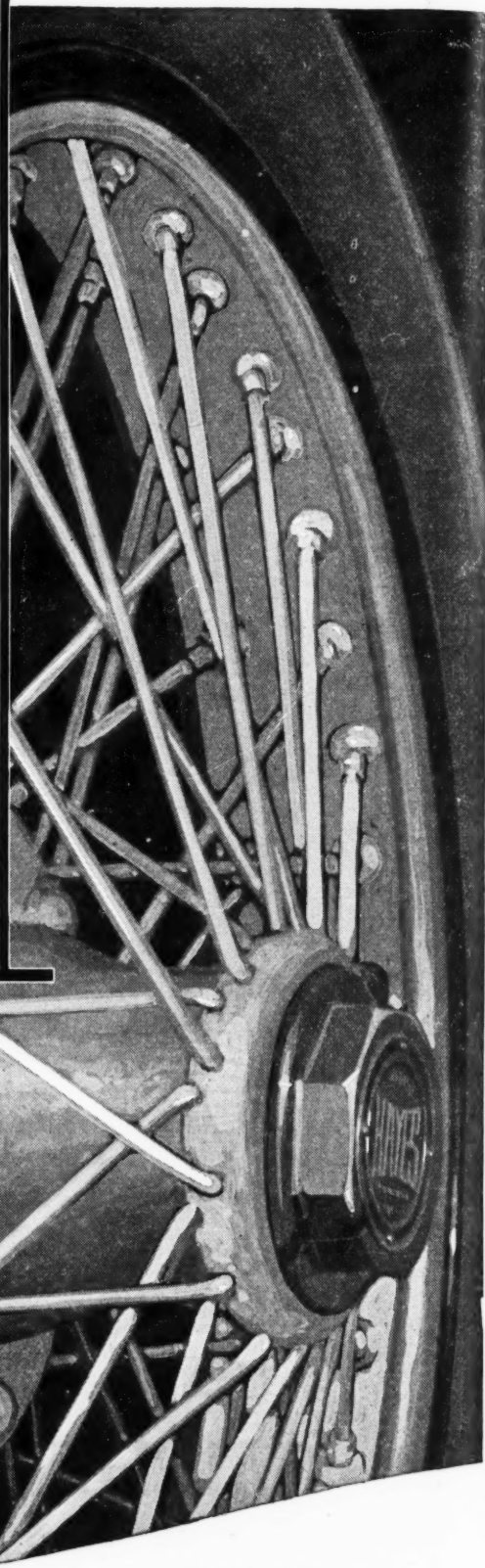
Brooklyn Service Co.  
1194 Bedford Ave. Brooklyn, N. Y.  
Hayes Wire Wheel Sales Corp.  
842-7th Ave. & 146 W. 55th St., N.Y.C.  
Evans & Lawrie Co.  
1090-2 Commonwealth Ave., Boston  
Samuel Scott  
2038 Ranstead St., Philadelphia, Pa.  
Miller & Woodward  
3751 Bigelow Blvd. Pittsburg, Pa.  
Brigman Motor Company  
491 Whitehall St. Atlanta, Ga.  
Siggins Sales Company  
106-8 E. Milwaukee Ave. Detroit  
Chicago Wheel & Rim Co.  
2010-12 Wabash Ave. Chicago, Ill.

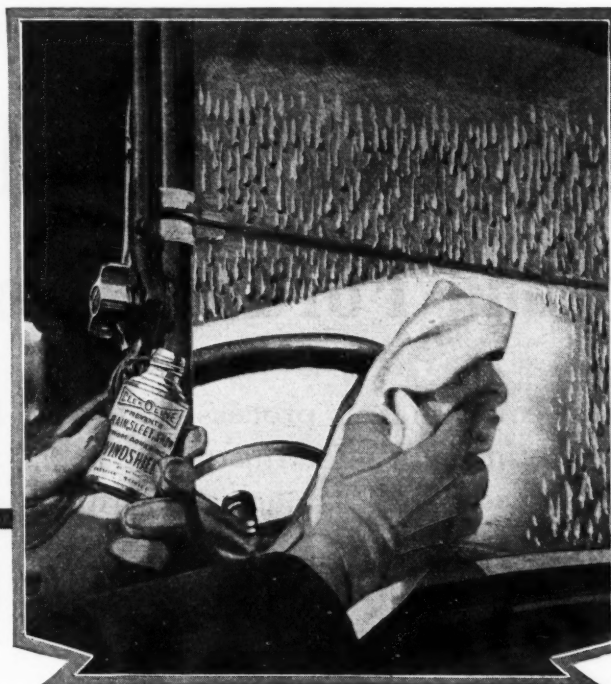
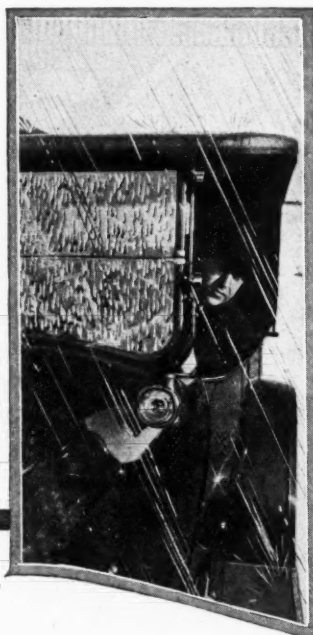
Auto-Marine Service Co.  
1027 Nicollet Ave., Minneapolis, Minn.  
Interstate Auto Company  
206-8 E. Superior St., Duluth, Minn.  
Motors, Equipment & Tractor Co.  
1310 S. Grand Ave., Los Angeles, Cal.  
C. H. Carter  
724 Van Ness Ave., San Francisco, Cal.  
Automotive Supply Company  
1558 Broadway Denver, Colo.  
The Three Captains Co.  
700 S. Ervay St. Dallas, Texas  
Wire Wheel Distributing Co.  
435 Stark St. Portland, Ore.  
Motor Products Sales Co.  
806 E. Pike St., Seattle, Wash.



# HAYES

Wire  
Wheels





## At the First Sign of Wet Weather

You put a little Cleroline, the new chemical compound, on a cloth, sponge or piece of tissue paper and rub off your windshield, wet or dry. Then you can safely drive anywhere, regardless of rain, snow, sleet, fog or mist.

And you'll enjoy the ride because you can see the road all the time for "all roads are clear with Cleroline."

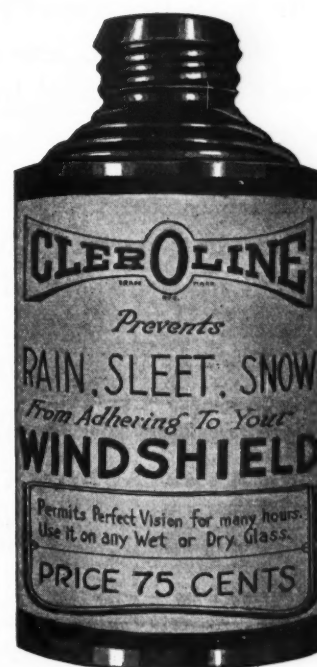
### Drive With Both Hands

Wet weather makes pavements slippery, roads treacherous and you need both hands on the wheel all the time. With Cleroline on your windshield you can drive for hours through a beating rain or snow storm. You are not bothered with that disagreeable job of scrubbing off the windshield every few minutes.

### The Advantages Appeal

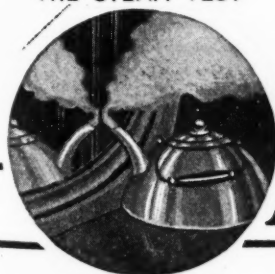
Many dealers declare that Cleroline is the fastest selling windshield clarifier on the market because of its many decided advantages. Retail for 75c a can. Liberal profit for dealer. Attractive counter display card furnished with reasonable order which sells Cleroline on sight. If your jobber cannot supply, write direct.

MANUFACTURED BY  
**CLEROLINE CHEMICAL CO., Inc.**  
507 Fifth Ave., New York City



Not a Soap  
Not a Grease  
But a Chemical Compound  
Requires No Mechanical  
Devices

THE STEAM TEST



# CLEROLINE

*Prevents Moisture from Adhering to Windshields*

# Machines That Save Time on Ford and Fordson Motors

**B**EFORE you install machines for burning-in, testing and running-in Ford and Fordson motors, have you considered the possibility of uniting these tools?

If you purchase a machine that combines these operations and will handle both Ford and Fordson engines, you take up less floor space, use less shafting and have a more systematic layout.

With the Fairbanks Universal Bearing Burning-in, Motor Test and Running-in Stand, all these operations may be performed on either the Ford or Fordson motors.

Bearings may be burned-in with the block either upright or inverted to allow the operator to watch the

process. He can also make any adjustment necessary while the machine is running.

For running-in, the oil sump in the stand is filled with oil to immerse the bearings.

Testing on the stand does away with towing the car to start it, and "test runs" by joy-riding mechanics. Any troubles that are detected may be remedied on the stand—there is no necessity for pulling the motor from the chassis.

The Fairbanks Universal is a complete self-contained unit. The base is on solid casting, with a low center of gravity. The machine is heavy enough to rest solidly on the floor without undue vibration.

Magneto and Coil Unit Tester  
Lifting Irons  
Automobile Engine Tester  
Bearing Burning-in Machine for  
Ford and Fordsons  
Motor Test Stands  
Engine and Axle Stands  
Bearing Boring Machines and  
Re-Babbiting Jigs  
Cylinder Re-boring Machines for  
Fords and Fordsons

Straightening Presses  
Arbor Presses  
Power Grinders  
Air Compressors  
Transmission Reaming Machines  
Special Ford Reamers  
Rear Axle Sleeve Pullers  
Radiator Test Plugs  
Piston Clamps  
Connecting Rod Straightening Jigs  
Bench Motor Clamps

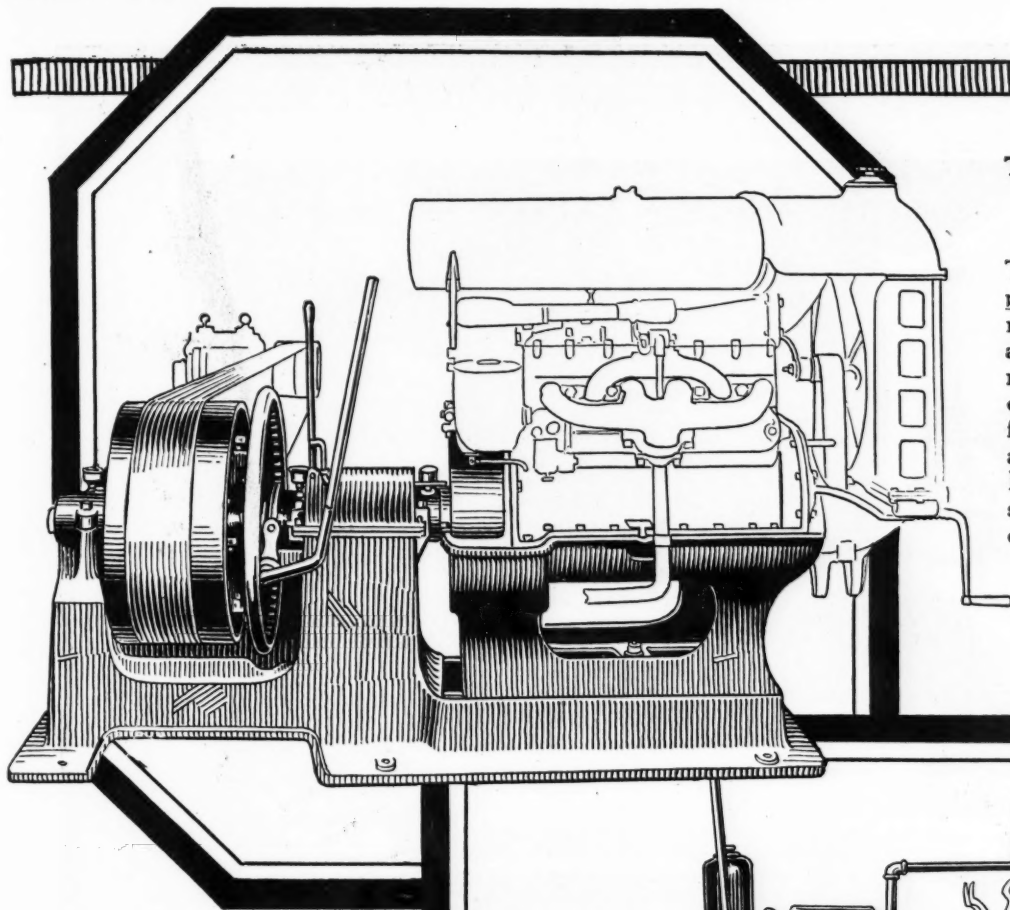
Transmission Drum Clamps  
Rear Axle Pinion Gear Presses  
Pinion Gear Pullers  
Piston Bushing Reamers  
Crank and Cam-Shaft Testing  
Machines  
Emergency Wheel Clamps  
Wheel Pullers  
Valve Port Renewing Tools  
Bushings Drivers  
Turning Bars

Speed and L Wrenches  
Special Jacks  
Rim Tools  
Tow Bars  
Combination Electric Drills and  
Valve Grinders  
Visible Measuring Gasoline Pumps  
Servistock Shelving for Ford Parts  
Special Ford and Fordson Tools and  
Machines

The  
**FAIRBANKS**  
SOLE DISTRIBUTORS FOR  
The Service Station Equipment Company; The Hempy-Cooper Manufacturing Company; The Peterson Engineering & Manufacturing Co.; The Steere-Kitson Company; The F-B Electric and Manufacturing Co., and other manufacturers of garage equipment.  
*Company*



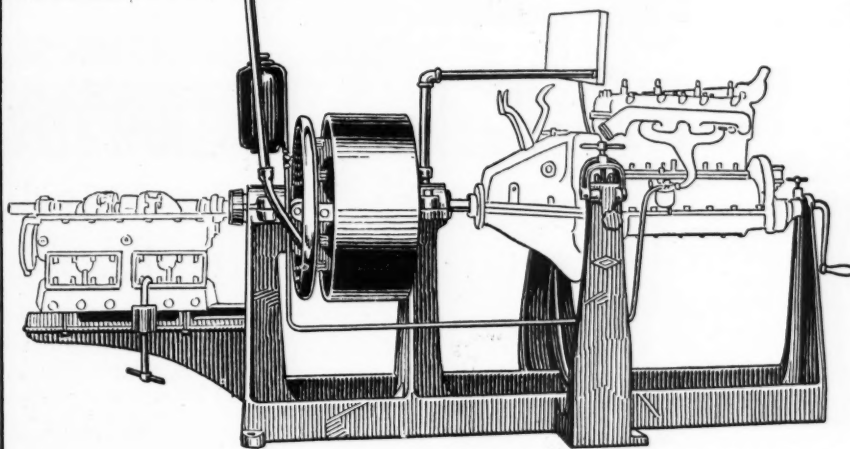
MILL, MINE & RAILWAY SUPPLIES - SCALES - VALVES - POWER TRANSMISSION - MACHINE TOOLS



### The American Universal Bearing Burning-in Motor Test and Running-in Stand

The illustration shows the complete assembled Fordson Motor running under its own power, after being limbered up and run-in at 600 R.P.M. The price of this machine complete with fixtures for burning-in, testing, and running-in both Ford and Fordson motors, including oil sump, is \$490.00 F. O. B. Chicago.

The illustration shows the American Junior Combination Bearing Burning-in, Motor Test and Running-in Stand burning-in a Ford block. This machine handles only the Ford Motor and is not fitted with oil sump. Price complete \$197.50 F.O.B. Chicago.



### THE FAIRBANKS COMPANY *Administrative Offices—New York*

#### Branch Houses

Albany  
Baltimore  
Birmingham

Boston  
Bridgeport  
Buffalo

Chicago  
Detroit  
Hartford

Newark  
New Orleans  
New York

Paterson  
Philadelphia  
Pittsburgh

Providence  
Rochester  
St. Louis

Scranton  
Syracuse  
Utica  
Washington

Havana, Cuba

London, Eng.

Birmingham, Eng.

Glasgow, Scotland

Paris, France

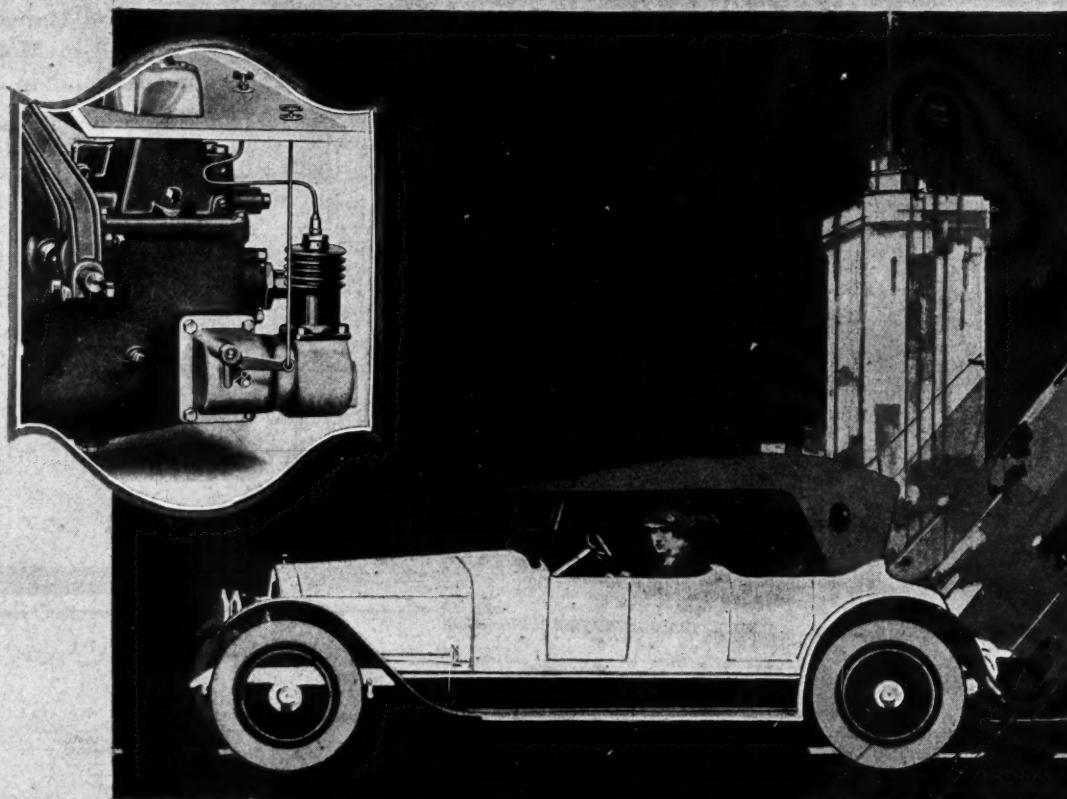
*The*  
**FAIRBANKS**  
Company

#### SOLE DISTRIBUTORS FOR

The Service Station Equipment Company; The Hempy-Cooper Manufacturing Company; The Peterson Engineering & Manufacturing Co.; The Steere-Kilson Company; The F-B Electric and Manufacturing Co., and other manufacturers of garage equipment.



TRUCKS & WHEELBARROWS - ENGINES & PUMPS - AUTOMOBILE & SERVICE STATION EQUIPMENT



## Quality Is Partly Assumption

The diamond purchased at a store nationally known for quality merchandise is assumed to be perfect. The customer seldom asks.

The motorist assumes that the finished car is Kellogg equipped—the same as he assumes each mechanical part is as perfect as you can make it.

Kellogg Engine-Driven Tire Pump Equipment is recognized as standard equipment on America's finest cars. Over half a million are in use, and the satisfac-

tory performance of KELLOGG PUMPS have so impressed motorists that they expect Kellogg Equipment on the finished car.

The cross-country truck, pneumatically tired, carries HEAVY DUTY KELLOGG ENGINE-DRIVEN TIRE PUMP EQUIPMENT.

Kellogg Engine-Driven Tire Pump Equipment adds a convincing argument to the other features upon which the superiority of the car is based.

**Kellogg Manufacturing Company**

Rochester, New York

# KELLOGG

*Engine Driven*

# Tire Pump

# RISING COSTS

*The greatest problem every garage, hardware, grocery or general store faces today*

---

## THE REMEDY MANY DEALERS HAVE FOUND WORKS BEST

---

*How all costs to dealers have risen:*

Labor costs have risen 60%. Expert mechanics now often get \$6 to \$8 per day.

Rent is 28% higher.

Costs of accessories, etc., 10 to 40% higher.

Shoes and other clothing cost 100% more.

Food is priced 85% higher.

Economists say that the dollar is worth only from 55 to 60 cents.

To equal a \$5,000 a year profit of two years ago you must net almost \$10,000 during the coming year.

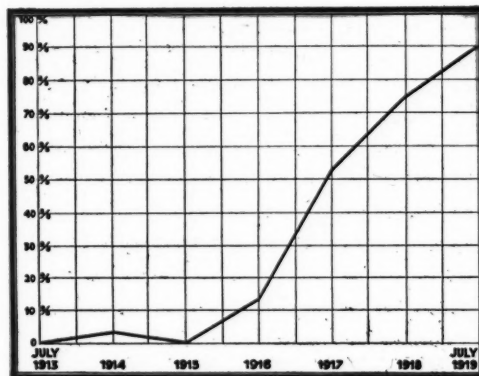
**W**HAT can the dealer do to meet the higher costs of living and conducting his business? How are the most progressive dealers of the country meeting these conditions?

You cannot charge a higher percentage of profit—the whole spirit of the country is against such procedure. Yet other retailers have found ways to double their profits. They have built, at the same time, a reputation for fair dealing and service.

*Giving something for nothing is not service*

Service is doing a good job at a fair profit, selling reliable goods at a fair price, giving good advice to customers.

The dealer who gives service of this kind, sells more goods, does more jobs—in that way he *doubles his profits*. Increased turnovers increase profits.



*The rise in the cost of living from July, 1913 to July, 1919, is shown graphically by this chart of food prices throughout the United States. Drawn from figures collected by the U.S. Board of Labor Statistics*

Take the case of an automobile accessory yielding a dealer's profit of  $33\frac{1}{3}\%$ . The man who does a business of \$600 a month makes a gross profit of \$200 every month. But if this \$600 is tied up in goods which it takes two months to sell instead of one, the rate of profit

is cut just in two—only \$100 a month. The man whose \$600 is invested in fast-moving stock makes \$2400 a year, the man whose money is in slow-moving stock makes only \$1200 a year.

You have only a certain amount of capital to expend for stock. Is there anything on your shelves that moves slowly? Get rid of it. That is the lesson that winning dealers of the United States have learned. Turn over the page: "How long will it take me to double, my profits?"

# How long will it take me

Jacob L. Haines, Lancaster, Pa., went from \$500 stock to \$50,000 stock in a short time

**J**UST a few years ago Jacob Haines was a clerk in a hardware store. He persuaded the owner to make him "Head of the Automobile Department" and to put in a \$500 stock of automobile accessories. He was given a case 3 x 10 feet in which to display his stock.

Contrast that with Mr. Haines' position in Lancaster and surrounding country today:

He has a 100-car garage, employs ten mechanics in the shop and is the local Ford agent. (Lancaster is a town of 50,000 people.) He has a wholesale store with a total of 4,800 square feet of floor space!

From the 3 x 10 foot space in the hardware store he went to 1,250 square feet the second year. His profits doubled in the first two months, tripled, quadrupled and doubled again.

## WHAT DID HAINES DO TO ATTAIN THIS REMARKABLE SUCCESS?

Haines decided when he opened his first department to *specialize*.

Specialization means that you *push* one brand. It means that you

always recommend that brand and know the reasons why it is best for every automobile.

To specialize successfully Haines knew that the first and most important point was to recommend quality products. As a specific example of the way he does business take the case of a lubricant. It had to be known and advertised to the consumer in big national magazine space.

To connect up with this national advertising he knew that he must put out advertising signs so that readers of the advertising would know what he had.



*The Veedol transparency, 12" in diameter, connects Mr. Haines' store with public opinion favorable to the lubricant itself*



# to double my business?

## Haines' success built by following one business principle

### HOW HE SPECIALIZES

He put out the Veedol sign. He talked Veedol to his customers. Every Saturday was specialization day for some one product—spot lights, spark plugs, oil, etc. On the first day that he talked Veedol exclusively he sold 84 one-gallon cans! He explained that Veedol reduces the amount of sediment formed by 86%. He told how Veedol reduces friction and wear, prevents excess carbon and saves 90% of engine trouble. He put Veedol Scientific Lubrication booklets in his monthly statements, and finally,

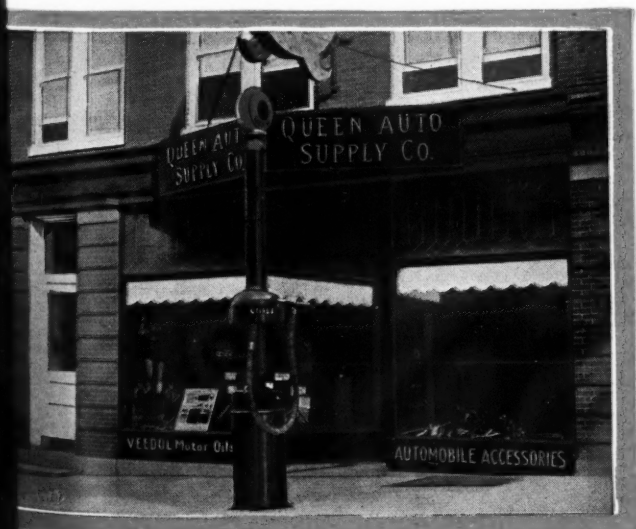
when the business began to warrant it, inserted a small advertisement occasionally in the local papers in Lancaster. Last year he sold \$8,500 worth of Veedol alone.

When he sees a car with a bad tire, he takes the number and writes the owner a letter recommending the nationally advertised tires he carries. When he sees a car smoking badly, he takes up the Veedol question with the owner.

"Specialization," says Haines, "is the simplest of business rules. It requires a quality product which is nationally advertised. It must have splendid talking points. From there on it is up to the dealer himself. He must put up signs, mail out booklets occasionally and when the time comes, use the local newspapers once in a while.

"That's the way I doubled my business in two months. I think any dealer can attain a remarkable success by this means, yet it is the only correct way. In fact, there is *no* other way that a success can be made.

"Specialization costs nothing to try. It requires no other extra work, no more investment, no more hired labor. Yet it is *sure fire*."



*Mr. Jacob L. Haines has two stores in Lancaster, Pennsylvania. A few years ago Mr. Haines began in the automobile accessory line with a case 3 x 10 feet in a local hardware store. Read his story of business success as told on these pages.*

# A plan you can use in your own business

**Y**OU need make no experiments. The men who have tried this plan have found it works as well for an oil and grease business of \$300.00 a year as it does for a business of \$10,000 a year.

## HOW TO START

Write today for the Veedol proposition. Find out why Veedol is so made, so advertised and so sold that this remarkable doubling is possible. The initial order of Veedol brings with it the orange and black Veedol metal flange sign, scientific booklets, lubrication



*This booklet on Scientific Lubrication is one of the "helps" which Mr. Haines found so valuable in building his large Veedol business*

chart, window transparency and other advertising material which will enable you to start your business on the road to beating the high cost of living. Veedol is stocked by 250 of the leading jobbers in the United States and Canada.

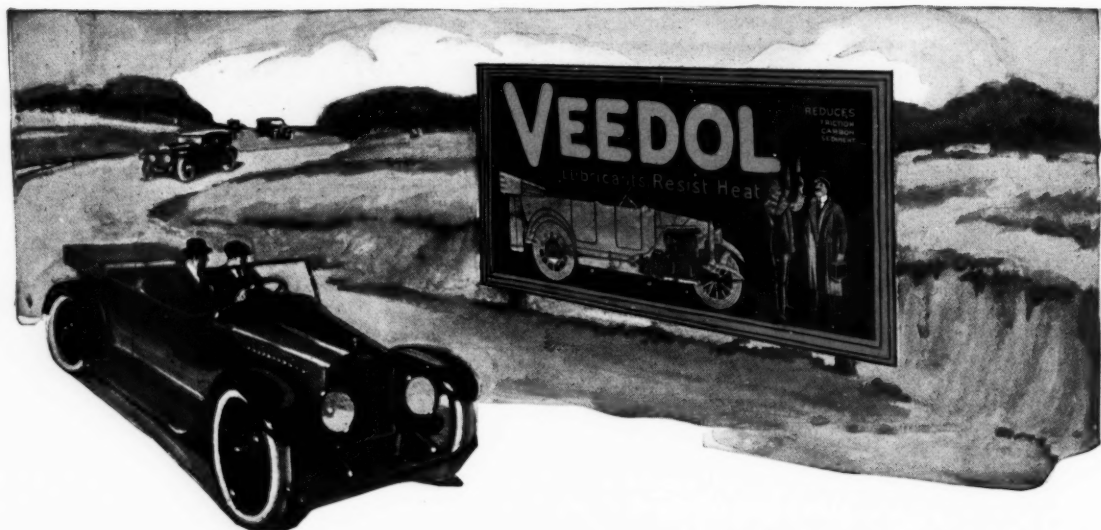
A postal card mailed today may solve the problem that you face. Ten thousand Veedol dealers started with a postal like yours. Now is the time to double your profits.



*The stores which Mr. Haines now owns display the Veedol metal flange sign because he has found that it brings customers*

**TIDE WATER OIL**  
Sales Corporation

11 Broadway, New York City



A ROLLING stone gathers no moss, but it puts many a tire out of the running.

It takes more than a stone, however, to break down the sturdy walls of a Kelly-Springfield.



More Than 15,000,000 Magazine Readers Are Being Told Monthly The Story of The AMERICAN

76 The Literary Digest for November 15, 1919



## The SMILE CAR

Motoring has a new meaning for owners of the AMERICAN Balanced Six. Cradled in comfort and security over the balanced AMERICAN chassis, you experience the complete joy of motoring.

Due to the scientific distribution of weight, which is the outstanding characteristic of this Balanced Six, the load is divided over each of the four wheels almost to the fraction of a pound. The chassis is not underweighted at the rear nor overweighted at the front. Each wheel carries an equal share of the load—with an effect upon the riding qualities of the car that is little short of amazing.

At all speeds and under all conditions of travel the AMERICAN holds the road as no other car does. There is no slip—no sideway when you take sharp turns. No skidding in ticklish places. It fairly hugs the roadbed.

For this reason the AMERICAN is known, wherever it goes, as the Smile Car. Behind the wheel of this Balanced Six in all truth the Miles become Smiles. Trouble never sits as your companion. In city traffic or on the open road you are equally at ease. Your AMERICAN will not fail you.

Miss PEARL WHITE—and the smile that has won millions in Fox Films—behind the wheel of the AMERICAN.



AMERICAN MOTORS CORPORATION  
FACTORY: PLAINFIELD, NEW JERSEY

AMERICAN  
The Balanced Six  
MILES OF SMILES

These Advertisements Are  
Appearing Regularly In Literary  
Digest, American, Colliers, Vogue,  
Motor Life, Motor, Etc.

# AMERICAN

## The Balanced Six

### M I L E S   O F   S M I L E S

## Have You Been Watching It, Too?

The growth of the AMERICAN has not been meteoric. But it has gone ahead in a manner that is exciting keen interest in the trade generally.

And any dealer who analyzes its growth almost invariably forms an attachment for the car and for the organization and policies behind it that is truly remarkable.

The development has not been "forced." The fast growing demand for this Balanced Six has developed normally. It is a tribute to superiority.

Before attempting to build up a sweeping demand for this car by a broad campaign of advertising, it had built into it—MERIT. And the merit that was built into it was what gave it its enviable record of PERFORMANCE.

Now that the AMERICAN has *proved* itself—now that it has won its way into the hearts of thousands of owners—we are telling a public of something like 15,000,000 people monthly what awaits them in this Balanced Six.

The thing that has "sold" these thousands of people—and that will sell many thousands more—is the very thing that will sell you on the AMERICAN—and that is *performance*.

Its riding qualities are a revelation to every man who experiences them. At all speeds and under all conditions of travel the AMERICAN holds the road as no other car does. There is no slip—no sidesway when you take sharp turns. No skidding in ticklish places. It fairly hugs the roadbed.

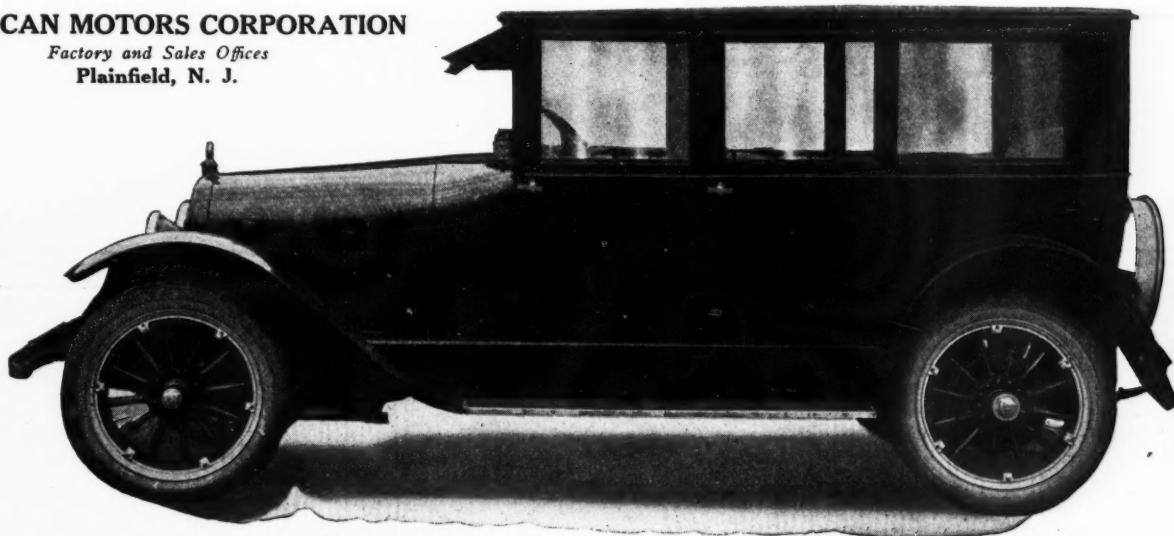
That's because you are riding in a car, the load of which is divided over each of the four wheels *almost to the fraction of a pound*. You can imagine the effect!

Going beyond the product of this Company to the *sales policy* that it has pledged itself to, you strike the keynote of the AMERICAN'S success. (*First*), Building a good car scientifically and substantially; (*Second*), Marketing it at as reasonable a price as is consistent with quality; (*Third*), Keeping squarely back of the dealer, rendering him every possible aid and co-operation in service and merchandising, and helping him make sales through the use of influential national publications and every other effective means this Company can devise.

To a limited number of automobile merchants whose ideas harmonize with ours and who see in the AMERICAN Balanced Six a permanent and profitable opportunity, we are ready to offer a contract for its sales representation.

**AMERICAN MOTORS CORPORATION**

Factory and Sales Offices  
Plainfield, N. J.



# Things Savage Axles do not do

Distort

*By the very nature of their construction, Savage Axles do not distort.*

*So light and so resilient are Savage Axles that not only is distortion practically impossible but in addition to this —*





*They act almost like a spring  
in minimizing the undesirable  
features of unsprung weight.*

*Savage Axles may be sprung  
a full inch out of alignment  
without taking a permanent  
set.*

SAVAGE ARMS CORPORATION

SHARON, PA.

UTICA

NEW YORK

DETROIT

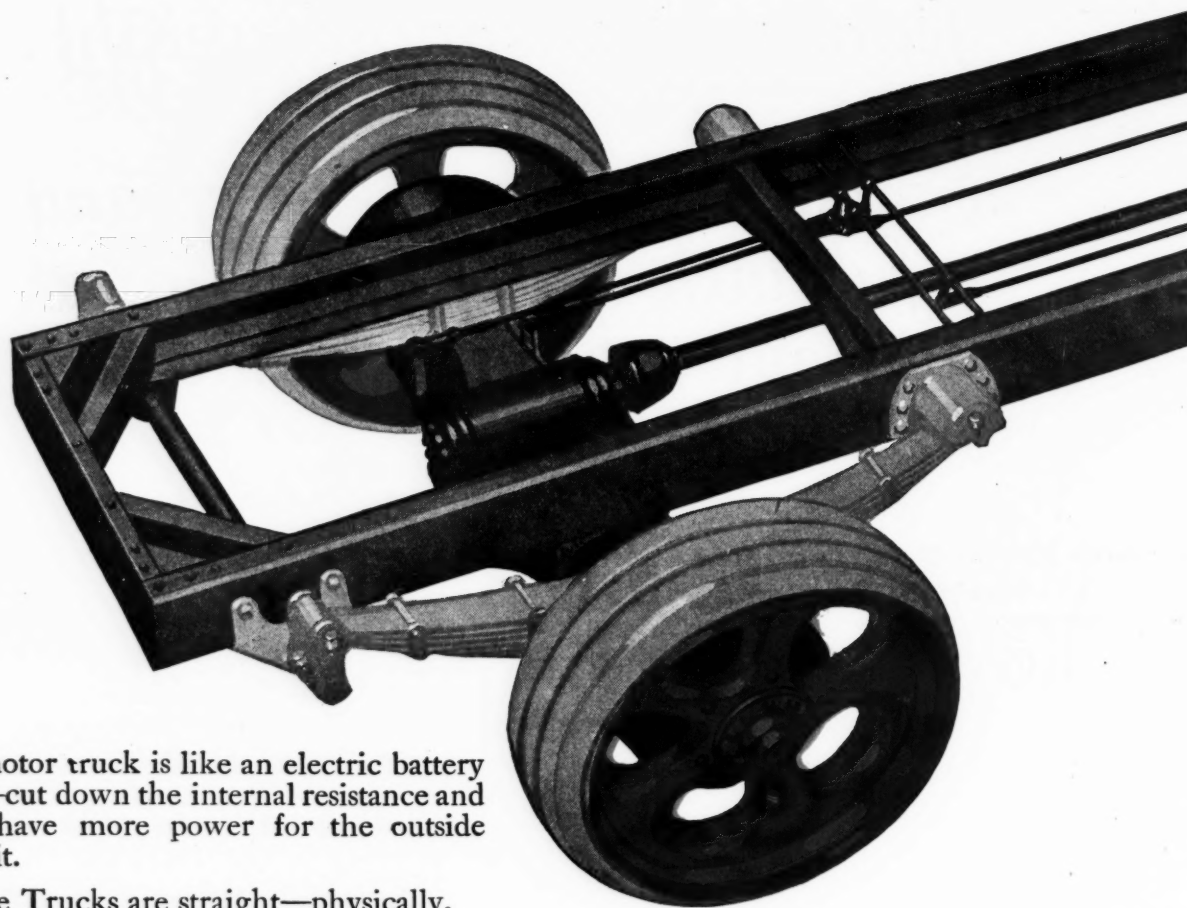
PHILADELPHIA

This is No. 3 of the  
things Savage Axles  
do not do



# Ace

MOTOR  TRUCKS



A motor truck is like an electric battery—cut down the internal resistance and you have more power for the outside circuit.

Ace Trucks are straight—physically.

The frame, drive shaft and brake rods are straight. The power is delivered in a straight line. All the control rods are straight. The cross members are straight.

The straightness of Ace Trucks results in strength positive action, minimum internal power losses, maximum power reaction on the load, ease of control, freedom from accidents and breakage, and longer life.

**Before we designed the Power IN  
we designed the Power Losses OUT**

1½-2 Ton \$2,800.00

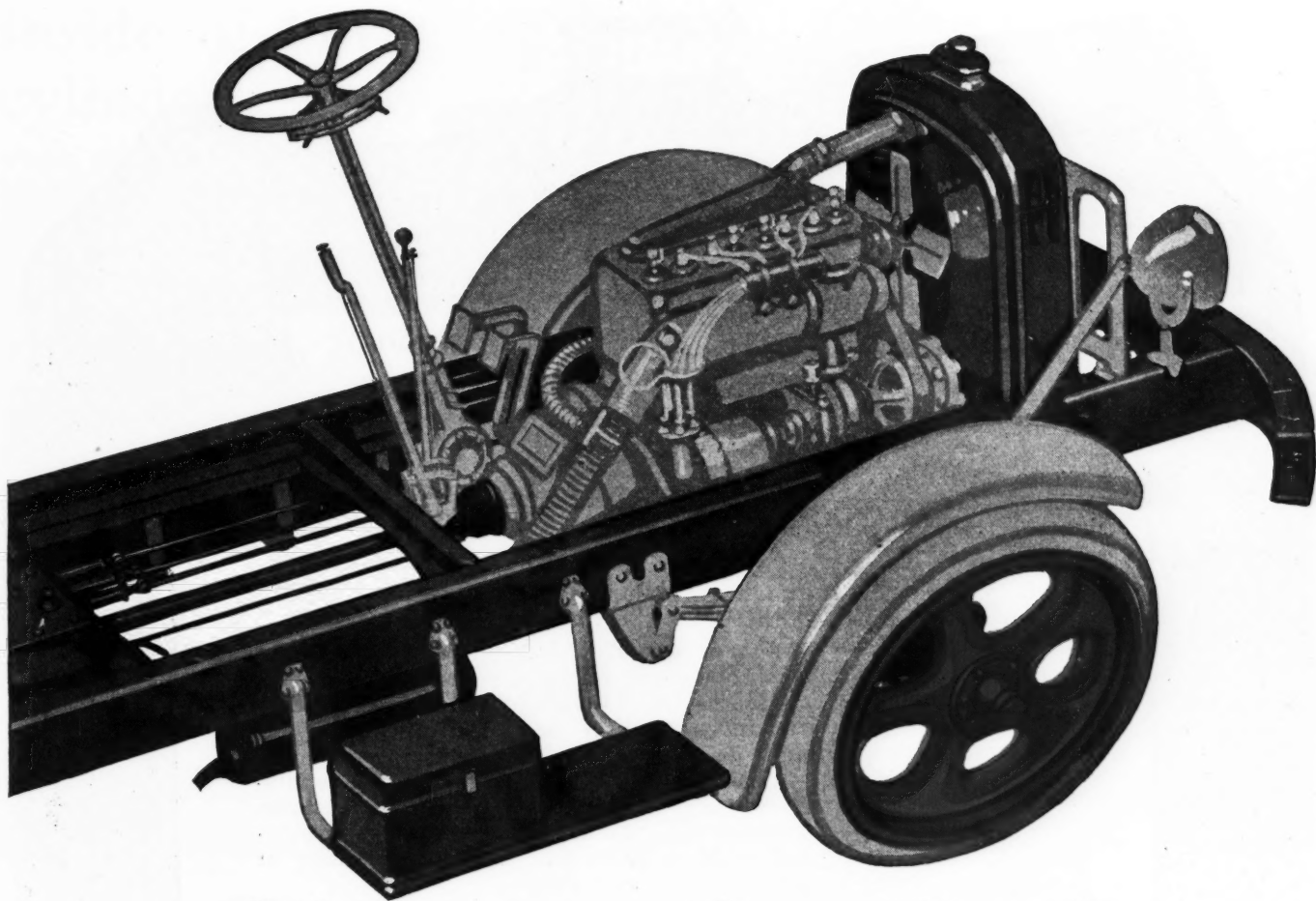
2½-3 Ton \$3,500.00

¾ Ton and 3½ Ton, to be announced.

We Will Exhibit at

8th Coast Artillery Armory, NEW YORK  
Section D, No. 3

International Amphitheatre, CHICAGO  
Section G, No. 6



# Straight

If all roads were dead level and the load on the truck never varied, universal joints would be unnecessary.

But roads are rough and loads vary, and for these reasons motor vehicles must have universal joints.

Now universal joints—even the best—waste power, by necessity.

There are only two ways to minimize universal joint wastage of power

—use the best universal joints, and give them the least possible work to do.

We believe Ace Trucks have the best universal joint—Spicer.

We know Ace Trucks demand the least possible service from their universal joints, because the chassis design is such that when the truck is normally loaded the drive shaft is absolutely straight, from crank shaft to worm pinion. That gives the engine the equivalent of a solid, straight, frictionless, non-corner torque that gets there one hundred per cent strong at the point where the tires track on the ground.

**Straight Dealers get a Straight Contract  
that builds a Straight Motor Truck Business.**

## Ace

**The AMERICAN MOTOR TRUCK COMPANY**  
NEWARK O H I O.



## DUAL MEANING of "TRUCK SERVICE"

**A**S applied to the truck industry, the word — "SERVICE" has a dual meaning.

It indicates those mechanical and structural qualities in Motor Trucks, which ensure truck purchase satisfaction through definite, dependable, **OPERATING SERVICE**.

It represents the physical ability, as well as the will of truck manufacturers to furnish **SERVICE** through prompt delivery of replacement parts, made necessary by accidents or honorable old age.

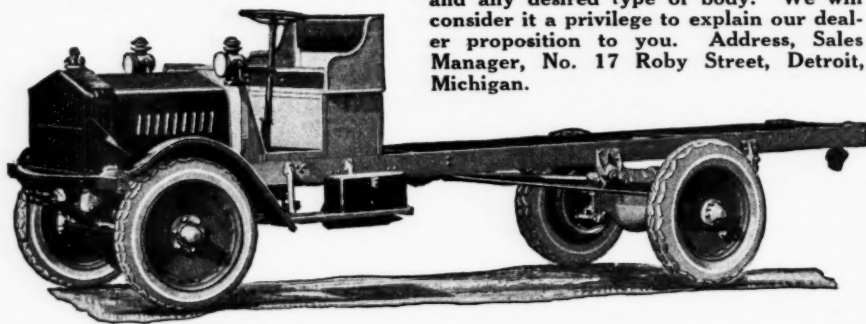
**HALL TRUCKS** are a complete exemplification of the possibi-

ties of both classes of "**TRUCK SERVICE**."

That's only natural, however, because the makers of **HALL TRUCKS**, as an organization, have been carefully and systematically establishing throughout the past 46 years a reputation for conscientious business dealing that is exceedingly valuable and worth maintaining at any cost.

That's only one of the reasons why a better truck than the **HALL** or a more complete or satisfying service than **HALL SERVICE** does not exist. *Let us prove those claims.*

We have some extremely desirable open territory and our selling franchise covers a complete truck line of 4 chassis models and any desired type of body. We will consider it a privilege to explain our dealer proposition to you. Address, Sales Manager, No. 17 Roby Street, Detroit, Michigan.



*Pneumatic Tire Equipped 2-Ton Hall Chassis*

As Manufactured by  
**The LEWIS-HALL IRON WORKS**  
DETROIT, MICHIGAN.

## Inside of hot cylinders—

where plunging pistons and hot explosions push the heat high and higher, where other oils break, Havoline Oil maintains a constant lubrication film.

Cars and trucks need such a protecting oil—one that intense heat cannot break.

So carefully is Havoline Oil refined and classed that there is a grade of Havoline that exactly fits the requirements of a passenger car, truck or tractor. Dealers will tell you just what grade is needed.

*Havoline greases are compounded of Havoline Oil and pure, sweet tallow. Clean to handle and correct in body.*

**INDIAN REFINING CO.**  
Incorporated  
NEW YORK

*Producers and Refiners of Petroleum*



**FIVE U.S. GALLONS NET**

# HAVOLINE

REG. U.S. PAT. OFF.

## OIL

"It makes a difference"

**MEDIUM**

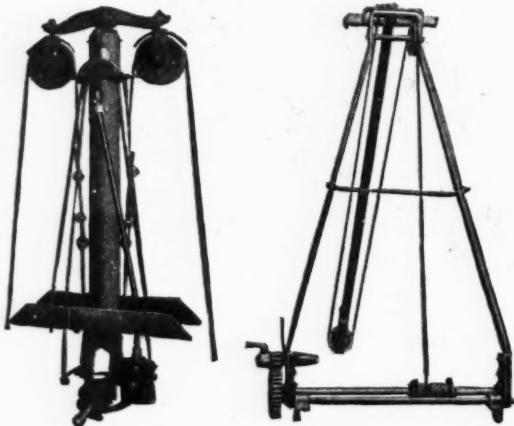
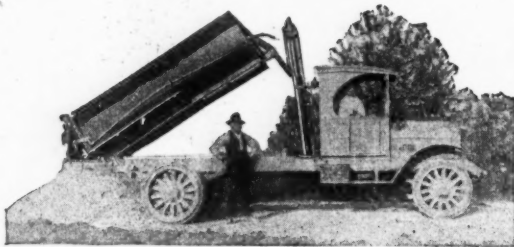
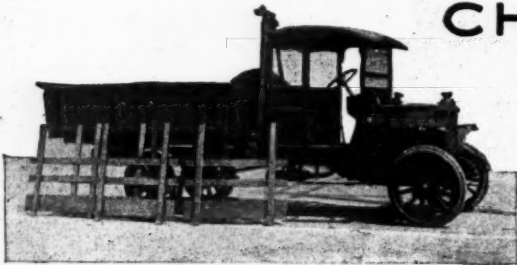
**INDIAN REFINING CO.**  
INCORPORATED

HAVOLINE  
MOTOR  
OILS

NEW YORK CITY

# DAILEY MOTOR TRUCK BODIES

## CHICAGO



**T**HE body is the one part of a motor truck that must be altered to fit individual haulage requirements.

Dealers with the agency for Dailey Bodies—wood and steel—and Dailey Hoists are enabled to promptly supply truck buyers with the most suitable type of body, and make a profit on the body as well as the truck.

We have grown with the truck industry, building our reputation on a firm foundation—dealer service and customer satisfaction. We design and deliver special bodies in record-breaking time.

Our trade mark is a sign of good work well done—a quality hall-mark on a product we are proud of.

This mark on a wood or steel body means that we absolutely guarantee it to give unqualified satisfaction to the buyer.

*Write us for full information on  
Dailey Bodies and Dailey Service*

**H. R. DAILEY**  
**Auto Truck Steel Body Co.**  
3028 Carroll Avenue Chicago

### Steel and Wood Body Distributors

Auto Truck Steel & Wood Body Co., 1815 N. 23rd St., St. Louis, Missouri.

Auto Hoist & Body Co., 18 Bainbridge Street, Brooklyn, N. Y.

Simplex Commercial Body Co., 1170 Jefferson St., Buffalo, N. Y.

The Truck Engineering Co., 3533 Cedar Avenue, Cleveland, Ohio.

Hydraulic Hoist Mfg. Co., 715 Lorraine Avenue, Detroit, Mich.

Auto Hoist & Body Co., 333 Avenue B, New York City, N. Y.

Troy Trailer Co., 5 North 21st St., Philadelphia, Pa.

Thomas & Company, Braddock Avenue, near Forbes St., Pittsburgh, Pa.

Simplex Mfg. Co., Conneautville, Pennsylvania.

The John Immel & Sons Co., Columbus, Ohio.

Springfield Commercial Body Co., 385 Liberty Street, Springfield, Massachusetts.

Springfield Commercial Body Co., Cambridge, Mass.



## A motor backed by service

A good motor seldom needs service—but no motor is infallible.

Carelessness, abuse, accidents, wear—the motor immune from these things has never been built.

That is why you should look into the service behind the motor as well as into the motor itself.

\* \* \* \* \*

When you buy a Continental Red Seal motor you buy a good motor.

A certainty—a motor that has demonstrated its worth on hundreds of thousands of automobiles and trucks.

A motor that has been selected for the power unit in the automobile and truck output of over 165 manufacturers—selected on the basis of proved merit.

\* \* \* \* \*

A good motor—and backed by exceptional service.

A motor so universally known and understood mechanically that any garage in any city, any town, or at any crossroad can serve you intelligently.

A motor sold by 16,000 dealers in Continental-equipped commercial and passenger vehicles, who naturally are qualified to render skillful, comprehensive service.

In addition, eight authorized parts and service stations, as listed below, are ready to serve you. The individual owner or any garage can get parts in a few hours' time by telephoning the nearest station.

Boston, Campbell Motors Corporation, 715 Beacon St. Chicago, The Beckley-Ralston Co., 1801 South Michigan Blvd. Kansas City, General Auto Parts Co., 1621 Grand Ave. Los Angeles, Colyear Motor Sales Co., 1222 So. Hill St. San Francisco, Colyear Motor Sales Co., 1247 Van Ness Ave. New York, Chadick-DeLamater Corp., 159 West 24th St. Philadelphia, Quaker City Motor Parts Co., Tioga & Richmond Sts. Minneapolis, Baldwin Service Co., 39 So. 11th St.

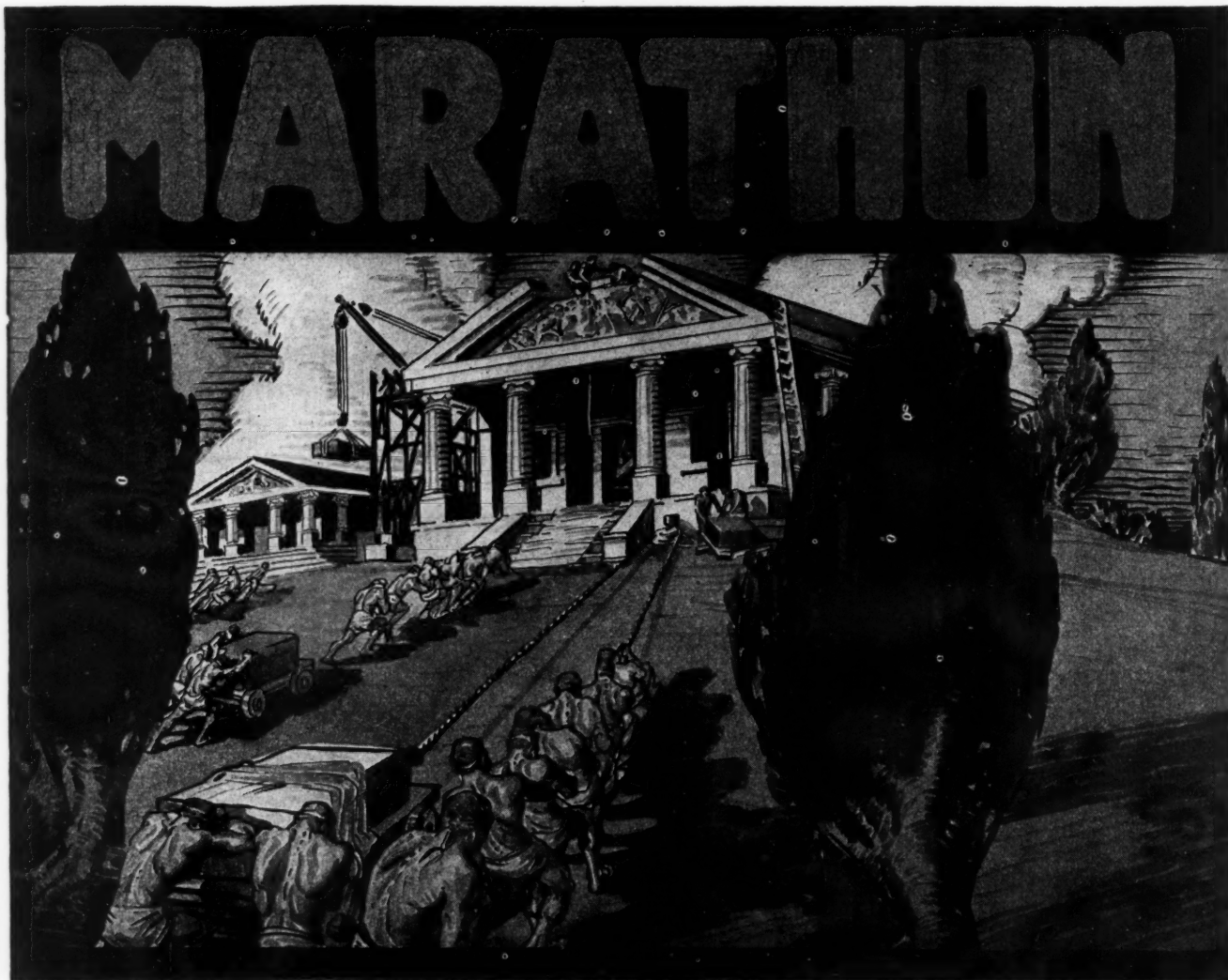
**CONTINENTAL MOTORS CORPORATION.**

Offices:  
Detroit, Michigan

Factories:  
Muskegon-Detroit

Largest Exclusive Motor Manufacturers in the World.

# Continental Motors



## BUILT TO ENDURE

The quality built into Marathon Cord Tires is reflected in the enthusiasm with which our distributors sell them—

Backing them in competition with any others, they know that here is a line on which they can rely.

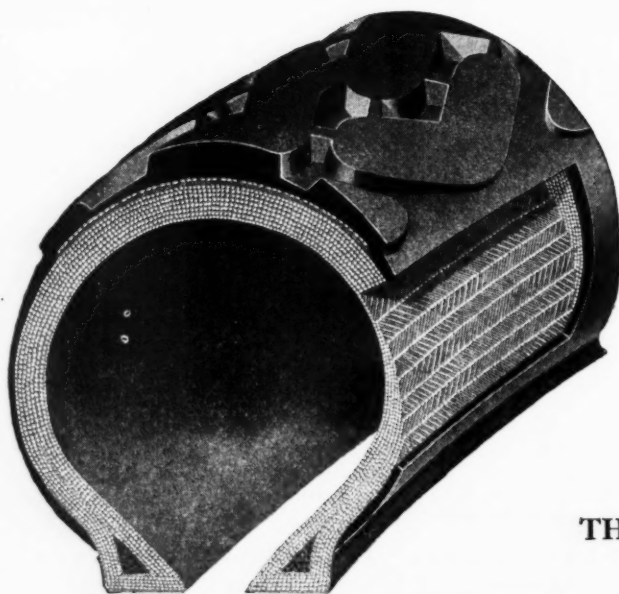
The unusual rapidity with which the Marathon distributor secures, and holds, the major portion of business in his territory will give you an idea of the competitive possibilities of the line.

If you are located in a territory where we are not yet represented, the opportunity is worth early consideration. Write us.

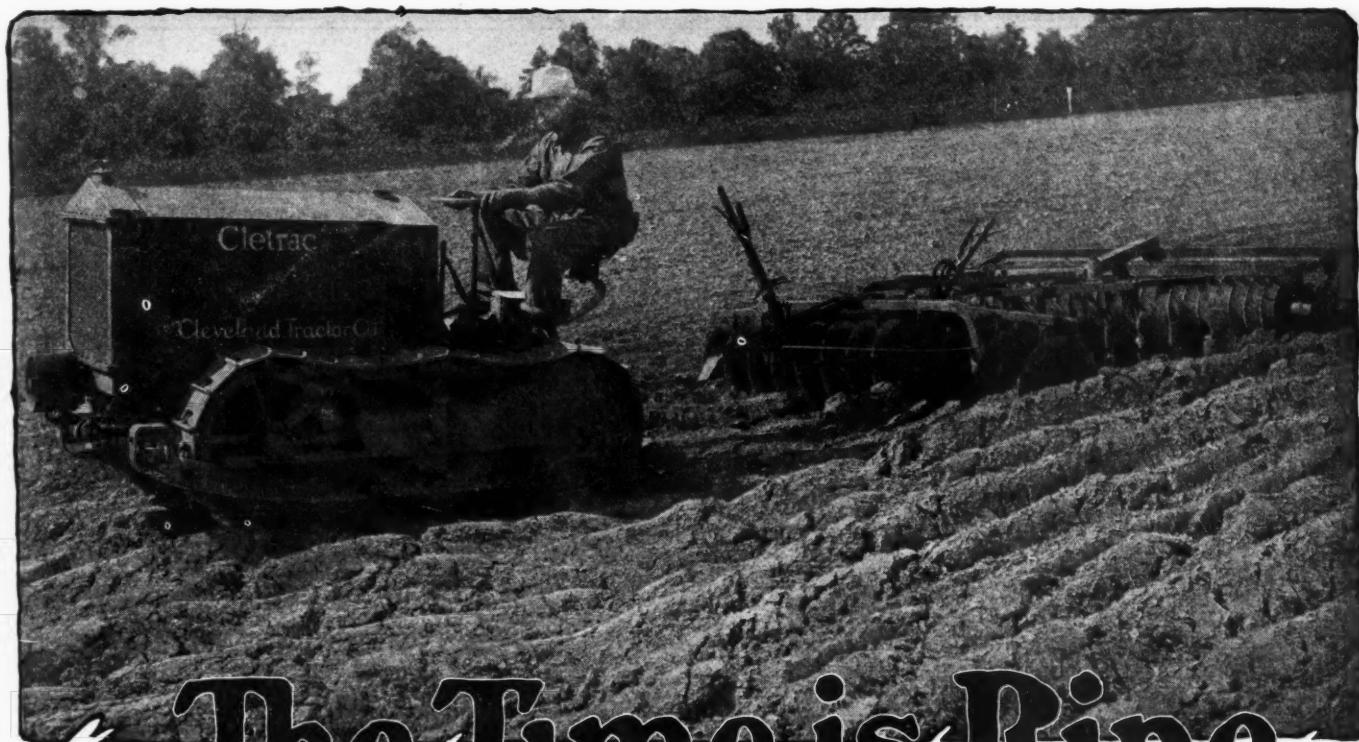
**THE MARATHON TIRE & RUBBER COMPANY**

Cuyahoga Falls, Ohio

Canadian Factory, St. Catharines, Ont.



# TIRE S



# The Time is Ripe

**U**P until a few months ago conservative farmers were still looking upon tractors as a distant possibility, but now these same farmers speak of tractor ownership as an immediate certainty.

Even those men who are in closest touch with tractor development are amazed at the way in which farmer opinion has swung irresistibly tractorward.

Farmers have not only found that they need tractors, but here is a decided preference for the

## Cletrac

**TANK-TYPE TRACTOR**

They want the Cletrac because it replaces horses on the farm not only for plowing but for every job the farmer has to do every day in the year. They know that it will give not only a complete haulage service but an economical and dependable stationary power service as well.

### 1920 Presents a Wonderful Opportunity for Cletrac Dealers

If you are going to sell tractors, get started now. Spring is only a few months away. The wise farmers will buy now and get acquainted with their Cletracs before the heavy spring work begins. Cletrac dealers are finding the winter a profitable time to line up and close their early spring prospects.

*Send for the dealer book, "Sale Quality in Tractors," today.  
It gives the whole story of this wonderful opportunity.*

## The Cleveland Tractor Co.

19169 Euclid Avenue

Cleveland, Ohio

*Largest Producers of Crawler-Type Tractors in the World*

*The Cletrac runs on a pair of tracks like a locomotive*

# Pasco Wire Wheels Are Easily Sold

HERE are the arguments with which you can convince motorists of the value of Pasco wire wheel equipment:

Pascos are five times as strong as wood wheels.

They are lighter, more resilient and hence more economical with tires.

They are interchangeable with wood wheels without altering the standard 56" tread—the tread for which the car was designed. The maintenance of standard tread saves tires when driving on rutty road.

The Pasco method of spoke lacing besides affording great strength, gives unusually high curb clearance and easy access to the valves. The spokes themselves are heavy and resist damage.

Each Pasco is perfectly balanced and absolutely trued by a special truing machine used only in the Pasco plant. This fact protects tires from excessive wear of a type on which adjustments are not allowed.

Pasco Wire Wheels can be detached and replaced in less than three minutes. They are made absolutely safe from running off by a double lock nut with right and left hand threads. There are no parts to break and no wear on threads. The hub cap is indestructible.

Finally, Pasco Wire Wheels are exceptionally beautiful. Their heavy spoke lacing and massive hubs give a car a low-hung, well-set appearance. People choose Pascos for the individuality and distinction they give to their cars.

And don't forget the small-car Pasco—the wheel that fits Fords, Chevrolets 490's and Overland Model 4's—offering the biggest possible market with the smallest stock. These wheels have the same exclusive features of the larger Pascos.

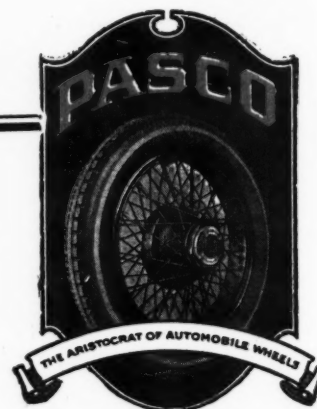
*Write us about Pascos*

**National Wire Wheel Works, Inc.**

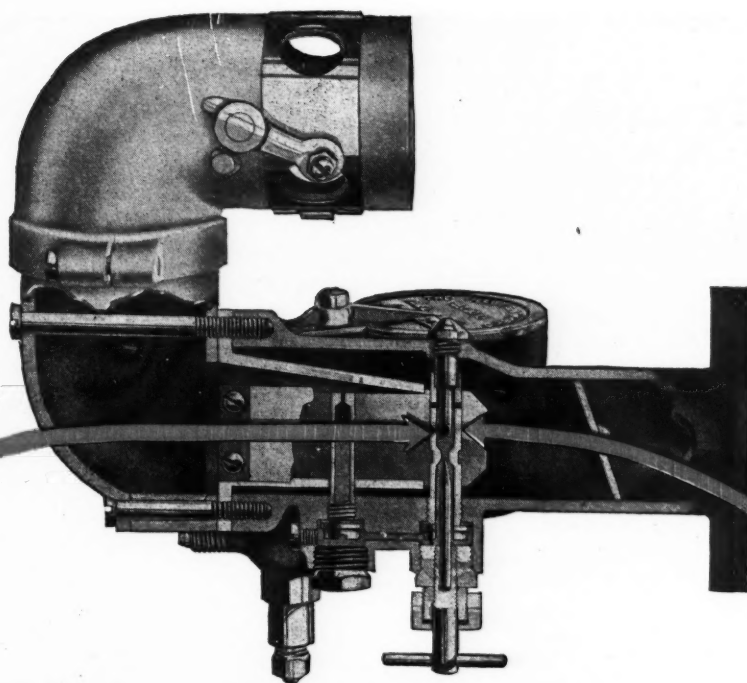
Factory: Hagerstown, Md.

Gen. Offices: 416-417 Book Bldg., Detroit, Mich.

NORTHERN ELECTRIC CO., LTD., Montreal, Canada



# PASCO WIRE WHEELS



# Tillotson

## CARBURETOR

THE Tillotson air valve, when adapted to the particular requirements of a motor, responds automatically and maintains unvaryingly that same partial vacuum and high air velocity, the correct combination of which insures the perfect mixture, regardless of engine speed.

The velvet smoothness with which the motor performs, and its unusual ability to deliver the last full measure of power, not

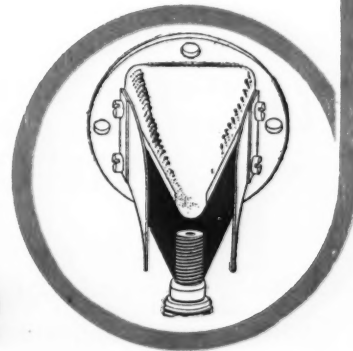
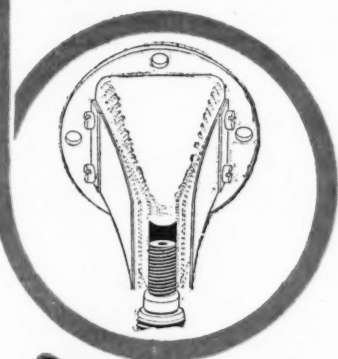
only throughout the usual throttle ranges, but also into extreme low engine speeds, demonstrates clearly the constant unchanging uniformity of the perfect mixture secured by the Tillotson carburetor.

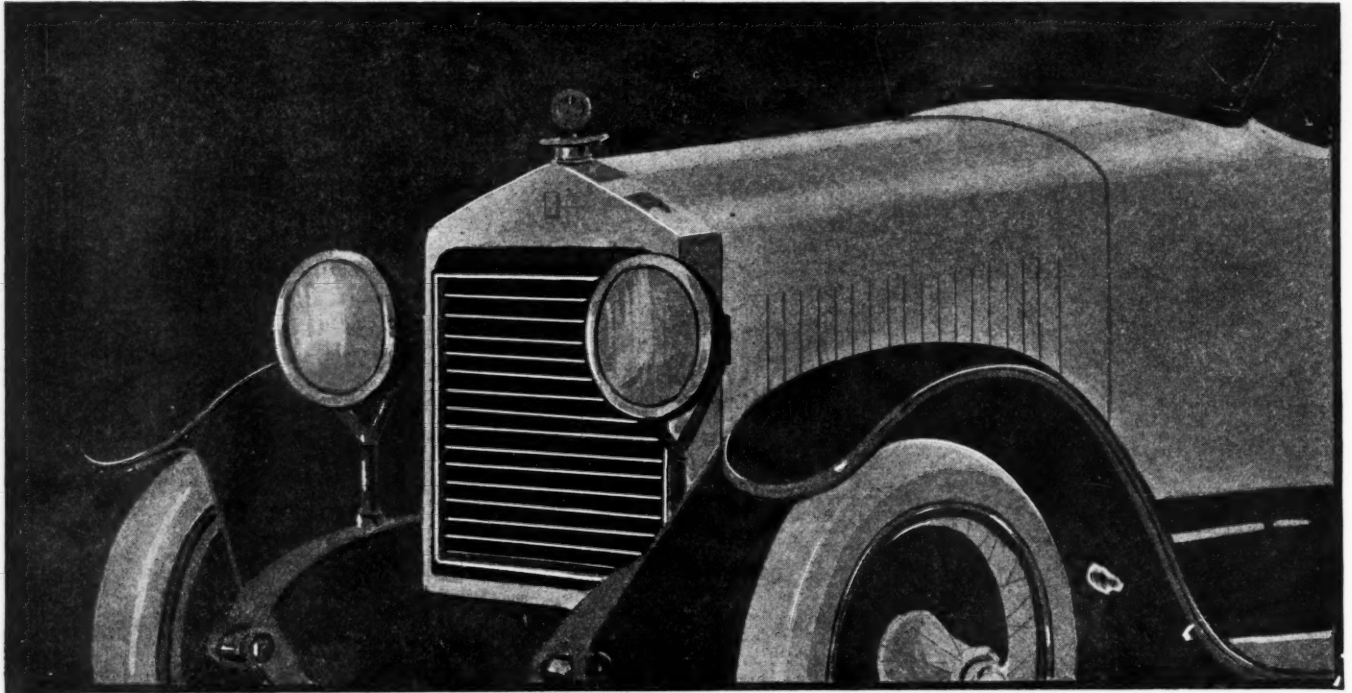
By engineers who investigate its merits, the importance of the Tillotson as a perfected carburetor of utmost simplicity is fully recognized.

May we figure on your carburetor requirements?

The Tillotson Manufacturing Company  
Toledo, Ohio

# Automatic Air Valve





## Greater Driving Economy and Satisfaction

**T**HERE's a lot of satisfaction in driving a car you know you can depend upon, regardless of weather conditions. And there is still greater satisfaction in selling such a car. Mr. Dealer, every car you now have on the floor can be made into just such a car and very easily too.

### The UNIVERSAL Is Made for the Following Cars:

Ford	1917 and later
Overland "4"	1920
Overland "90"	all models
Maxwell	1917-18-19
Maxwell	1920
Chevrolet	1917-18-19-20
Dodge	1915 and 16
Dodge	1917-18-19-20
Buick	all 1917 "D" models
Buick	all models "E" 1918, "H" 1919, "K" 1920
Oakland	1918-19-20
Saxon "6"	1917-18-19-20
Reo "R" and "S"	
Studebaker Series "19" Little Six	
Studebaker Series "19" Big Six	
Chalmers	35C. 1917-18-19-20
Chandler	1917-18-19-20
Hupmobile	1917-18-19-20
Nash	1917-18-19-20

Other types being developed

Simply equip it with the UNIVERSAL Radiator Shutter. The radiator shutter is revolutionizing automobile efficiency. Automotive Engineers recognize the shutter as an all year round necessity—winter and summer—for the efficient operation of the motor.

## UNIVERSAL RADIATOR SHUTTER

Enables positive regulation of the flow of air so that just enough strikes the motor to keep it operating at the correct temperature of 185 degrees—the point where all fuel vaporizes and makes power in the cylinders instead of kerosene in lubricating oil and carbon in motor.

Dealers—Profit by this tip. Order UNIVERSAL Shutters today. Equip every car you now have on the floor with the UNIVERSAL Radiator Shutter and make it easier to sell. Any one can install a UNIVERSAL within one hour. Order NOW!



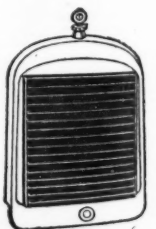
OPEN

## Auto Metal Parts Company

DEPT. OF SALES—624 MICHIGAN AVE.

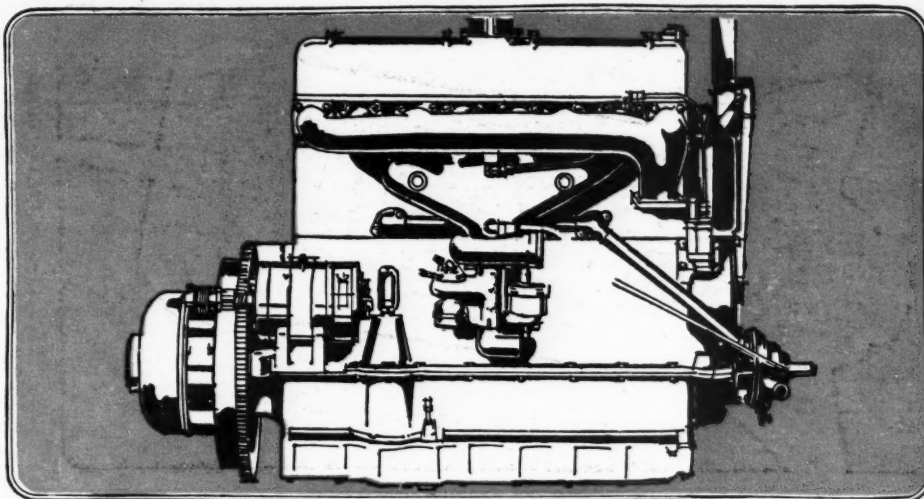
CHICAGO, ILL.

FACTORY—DES MOINES, IOWA



CLOSED

*The High Efficiency Motor is so rigidly constructed and accurately balanced that it operates smoothly at every speed.*



## PERFORMANCE

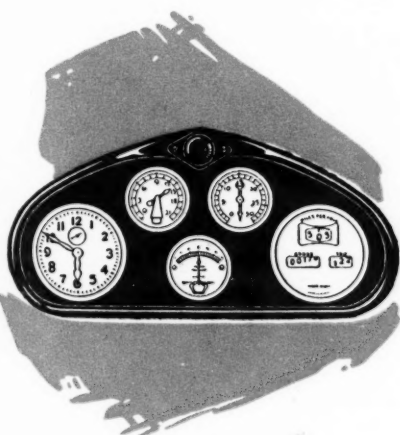
*Car with 4 to 1 gear ratio.*

Acceleration 10 to 50 m.p.h. in high gear, 15.8 seconds. Half mile at average speed of 65.7 m.p.h. Timed with a stop watch.

Run in high gear at walking speed for about 100 yards.

Hill climbing in high gear, starting 5 m.p.h. at bottom; speed at 1000 ft. (8.16% grade) 27 m.p.h.; speed at 1775 ft. (6.14% grade) 43 m.p.h.

Starting 10 m.p.h. at bottom; speed at 1000 ft. (8.16% grade) 30 m.p.h.; speed at 1775 ft. (6.14% grade) 47 m.p.h.



*Grouped under one glass, illuminated by indirect lighting, every dial is clearly visible and readable.*

# The New High Efficiency Motor

## *Its notable features*

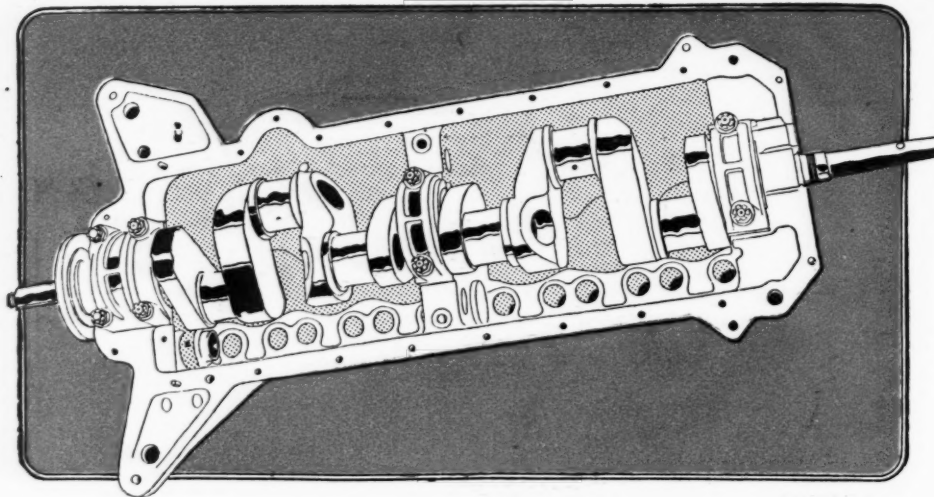
*A previous insert told of the remarkable performance of a motor car which an old-established manufacturer is bringing out in a new series. This insert describes some of its features.*

**T**HIS motor of the new car which is a result of the manufacturer's experience in the production of the Liberty aircraft motor, embodies among other improvements, new design in cylinder construction, bearing construction, pistons, valve operating mechanism, crankshaft and system of automatic oil lubrication and cooling.

**The crankshaft and bearings** A crankshaft of unusual size—the main bearings being  $2\frac{3}{4}$  inches in diameter—of the same special alloy steel as used in Liberty engine crankshaft, is balanced in static and running tests.

Bearings are fitted *without scraping*. They are of new construction in that they are backed with *cast iron*, thereby maintaining a uniform fit for the crankshaft even under varying conditions of temperature. They are also fitted *without shims*, so the film of oil is unbroken.

The bottom side of the crankcase is *lapped*, so there is no variation in its surface, and all holes for placement of bearings can be bored absolutely true. The result is a rigid and balanced crankshaft—sized to one-half thousandth of an inch, yet so accurately fitted it can be flipped over with a finger's pressure.



*The heavy crankshaft with bearings  $2\frac{3}{4}$  inches in diameter gives a stiff backbone to the motor and eliminates vibration.*

### ***Pistons and connecting rods***

The piston is in two parts: the head and central structure of aluminum; the skirt of cast iron. This combination gives the lightness and heat conductivity advantages of aluminum; the snug fitting possibilities of cast iron. It gives a light weight piston that fits closely, does not carbonize freely. The forged steel connecting rods are *machined all over* to insure uniformity of weight and balance.

### ***Pressure Oiling System***

Oil is fed under pressure to all motor bearings; the pressure is in proportion to the work the motor is doing. At high speed eight or nine gallons of oil circulate through the crankshaft per minute. This cools the bearings as water cools the cylinders. This is the only system that serves both to lubricate and cool. An oil lead in the valve cover supplies streams of oil to lubricate the rocker arms and push rods.

### ***Other Improvements***

Besides the features briefly described here, there are other improvements and refinements to be found in this motor, all of which contribute to make it the high efficiency engine.

Public announcement of the new series is being withheld, until all distributors and dealers have been supplied with cars. The car will be exhibited at the New York Show, but if further details are desired before that time they will be furnished by the Engineering Department. **In making inquiry, address Manufacturers High Efficiency Motor, care**

**MOTOR AGE, Mallers Bldg., Chicago.**

### **PERFORMANCE**

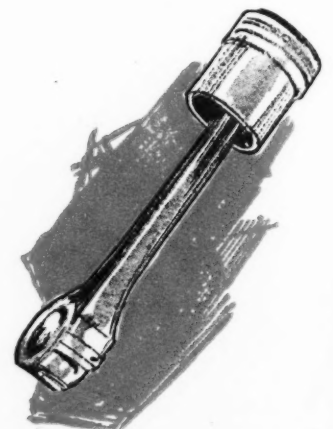
*Car with 3.75 to 1 gear ratio.*

Acceleration 10 to 50 m.p.h. in high gear, 18.8 seconds. Half mile at average speed of 69.75 m.p.h. Timed with a stop watch.

Run in high gear at walking speed for about 100 yards.

Hill climbing in high gear starting 5 m.p.h. at bottom; speed at 1000 ft. (8.16% grade) 24 m.p.h.; speed at 1775 ft. (6.14% grade) 40 m.p.h.

Starting 10 m.p.h. at bottom; speed at 1000 ft. (8.16% grade) 26 m.p.h.; speed at 1775 ft. (6.14% grade) 43 m.p.h.



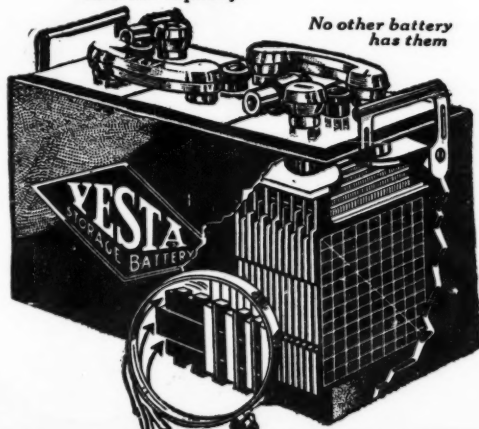
*The two-piece piston and all-over finished connecting rod furnish examples of advanced design and manufacturing care.*



## Vesta Service Stations Hold the Good-Will of the Motoring Public

### Reasons for Vesta Satisfaction

1. **Vesta Indestructible Isolators**—an ingenious device locking the plates apart and preventing short circuits.
2. **Vesta Impregnated Wooden Mats**—preventing "treeing" and its disastrous consequences.
3. **Titanium**—a rare mineral entering into the lead plates, hardening them and giving them longer life in use. It precipitates minerals and impurities in solution, thus increasing the efficiency of the battery.
4. **The Vesta Poro-Hard Plate**—a plate which is hard and extra durable, but because of its exceptional porosity, gives unusual capacity.



VESTA batteries through their inherent superior qualities, have created a good-will among motorists which makes a Vesta dealership valuable.

Furthermore, the word-of-mouth advertising with which these motorists spread the reputation of Vesta batteries makes these dealerships increasingly profitable year after year.

Every Vesta service station is completely equipped to handle any kind of battery repair work. Motorists know this and many who do not use Vesta batteries come to the Vesta dealer for their repairs. One reason for this is that part of the patented features which have made Vesta batteries famous can be used in the repair of other makes.

In fact, in many of our service stations more than 75% of the repair work is on other makes of batteries.

Vesta service stations everywhere are associated to promote this good will.

There is still room in the "Vesta family" for a few more dealers who are prepared to live up to our high standards of quality and service.

**Vesta Accumulator Co.**

2100 Indiana Avenue

Chicago, Illinois

# Napoleon Territory is Allotted Carefully because it is only Allotted Once

NAPOLEON Motor Trucks are made up of nationally advertised parts known to 90% of the buying public.

This feature alone reduces sales friction to a minimum—the big reason why NAPOLEON Dealers are so prosperous.

Ever since the first NAPOLEON Truck was built, and put on the market, it has been the policy of the NAPOLEON Motors Company to proceed carefully in every detail of their business—and to be right.

Every NAPOLEON Truck in service today is a symbol of this policy.

Every NAPOLEON dealer represents the same principle. NAPOLEON territory is allotted carefully because it is only allotted once—and the benefit is two-sided, for the dealer and the manufacturer alike.

**Model 9**  
1-Ton Chassis  
Solid Tire Equipped  
**\$1385**

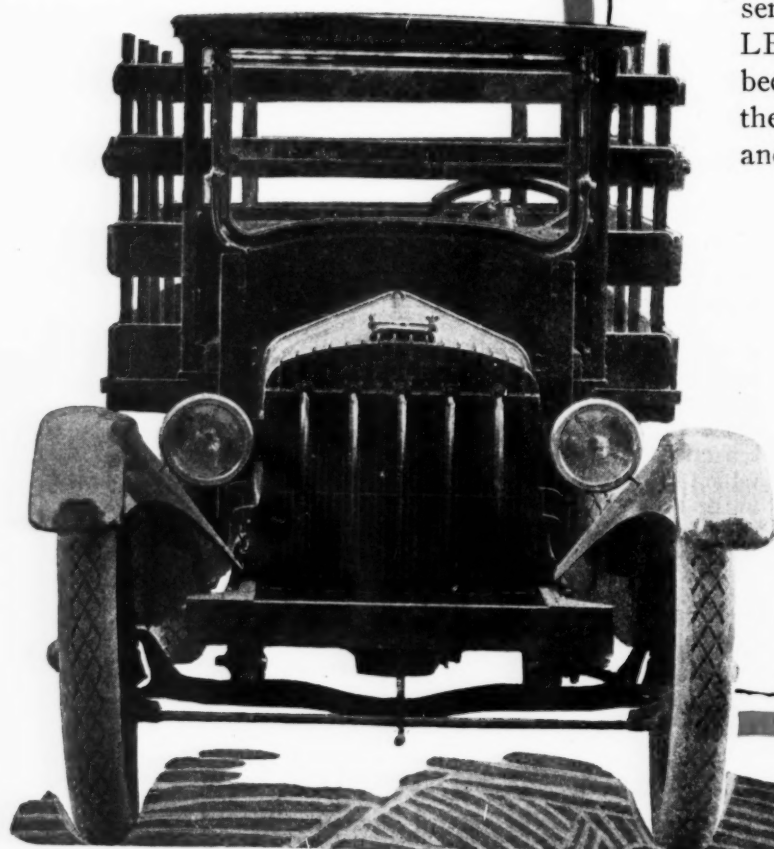
Pneumatic Tire Equipped  
**\$1550**

**Model 11**  
1½-Ton Chassis  
Solid Tire Equipped  
**\$1660**

Pneumatic Tire Equipped  
**\$1860**

**NAPOLEON MOTORS  
COMPANY**

Traverse City, Michigan



## "Horse Sense"



It is estimated that the crops of 125,000,000 acres of land are required annually to feed horses. If wheat were raised on this land, its value would be sufficient to pay the National debt and Liberty Bond issue.



Motor trucks have made it possible for farmers to reach markets that are better than the one nearest to them.



Time is man's greatest asset—the more time saved, the more money made—dealers and users know the Traffic does both.



Just as the old stage-coach compares with the modern train for traveling, wagons and teams compare with the Traffic Truck for hauling.



**The Traffic is the lowest priced 4,000-lb. capacity truck in the world. Built of standardized units.**



### Traffic Specifications

**Red Seal Continental** 3 $\frac{3}{4}$  x 5 motor; **Covert transmission**; multiple disc clutch; **Bosch magneto**; 4-piece cast shell, cellular type radiator; drop forged front axle with **Timken roller bearings**; **Russel rear axle**, internal gear, roller bearings; semi-elliptic front and rear springs; 6-inch U-channel frame; **Standard Fish tires**, 34 x 3 $\frac{1}{2}$  front, 34 x 5 rear; **133-inch wheelbase**; 122-inch length of frame behind driver's seat; oil cup lubricating system; chassis painted, striped and varnished; driver's lazy-back seat and cushion regular equipment. Pneumatic cord tire equipment at extra cost.

Chassis  
\$1395 Factory



### Notice to Dealers

It is Traffic policy to make direct connections in every city, town and village throughout the United States. Wire for territory you want and if open come to the factory and see the Traffic produced and perform.

# Traffic Truck

4,000 LBS. CAPACITY

From Where  
Orange Blossoms Grow

\$1395

**WESTERN UNION TELEGRAM**

CLASS OF SERVICE SYMBOL

Day Message	Blue
Day Letter	Blue
Night Message	White
Night Letter	White

If more than three symbols are used after the check (number of words) this is a day message. Otherwise its character is indicated by the symbol appearing after the check.

NEWCOMB CARLTON, PRESIDENT  
GEORGE W. E. ATKINS, FIRST VICE-PRESIDENT

1919 OCT 15 PM 6 10

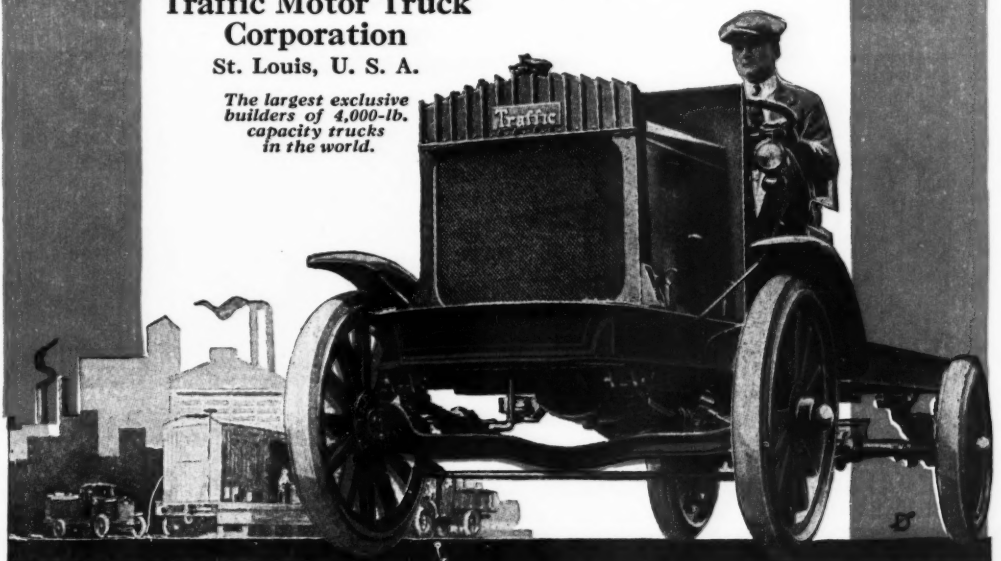
RECEIVED AT COMMERCIAL BUILDING, 514 OLIVE ST., ST. LOUIS, MO.

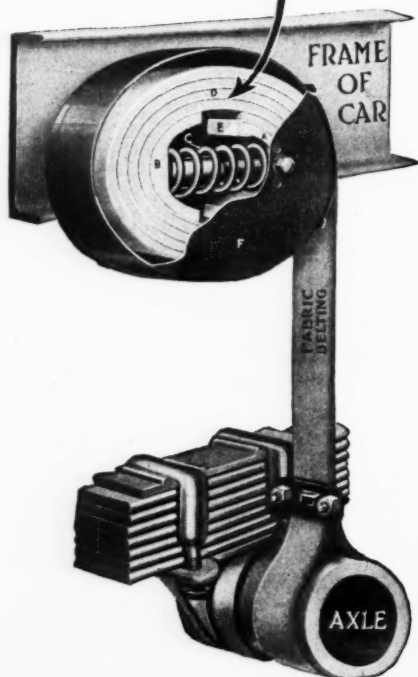
A447AN 45 NL  
TAMPA FLA 15  
TRAFFIC MOTOR TRUCK CORPORATION  
ST. LOUIS MO.  
RUSH SIX CARLOADS OF TRAFFICS YOU HAVE ON ORDER. THE TRAFFIC  
HAS SOLD ITSELF TO FRUIT GROWERS HERE TO THE EXCLUSION OF  
ALL OTHER TRUCKS.  
TRAFFIC TRUCK SALES CO.

## Traffic Motor Truck Corporation

St. Louis, U. S. A.

The largest exclusive  
builders of 4,000-lb.  
capacity trucks  
in the world.





## Everybody is Using Snubbers

GABRIEL MANUFACTURING COMPANY  
1415 E. 40th St. Cleveland, Ohio

# GABRIEL SNUBBERS

*Make the Car Ride Easier and Last Longer*

---

*It No Longer Takes Time and  
Trouble and Skill to Perma-  
nently Repair Cracked Castings*

## **PETERS' METALLIC FILLER** (Nicro Spelter)

*Meets the Winter Demand for Re-  
pairs of Cracked Water Jackets*

**S**O greatly has Mr. Peters' new invention improved and simplified repair work on steel, iron, brass and bronze castings, that the repairman can now do a good many jobs in the time that it originally took to do one.

And with none of the danger and difficulty involved in the old high temperature method of brazing it eliminates all possibility of warping or misaligning the casting.

Peters' Metallic Filler fuses at 300 degrees, yet it makes a permanent repair better than any other method that has ever been devised. Remember, Peters' Metallic Filler is a metal, not a cement or paste.

*The price of the repair-  
man's package is \$5.50.  
Consumer size, \$3.00. If  
your dealer or jobber can-  
not supply you, order di-  
rect.*

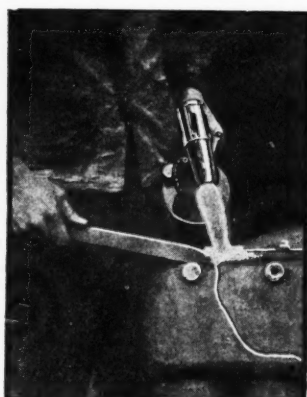
**Aluminum Brazing Solder Co.**  
1303 Widener Bldg. Philadelphia, Pa.

You can repair a cracked cylinder without removing the engine—a time-saving advantage that is too obvious to need comment.

No skill is required. Any man with a pair of hands can apply the Filler with perfect results. All he needs is an ordinary gasoline or kerosene blow torch.



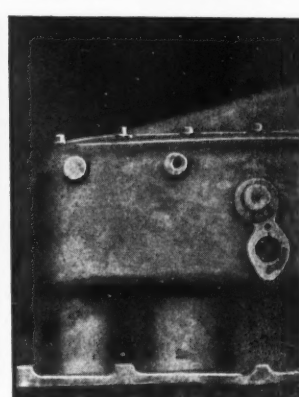
*You first clean the crack thoroughly and bevel the edges.*



*Then heat for a moment with an ordinary hand torch (300 degrees ample) and apply the filler.*



*While the hot metal filler is still soft, pack and roll it smooth.*



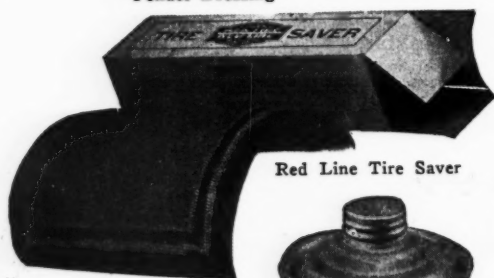
*Allow to cool for five minutes, dress off with a file and the job is done.*

# RED LINE

Red Line  
Valve Grinding  
Compound



Red Line Combination Body Polish, Hood and Fender Dressing



Red Line Tire Saver



Red Line Penetrative Oil



Red Line Carbon Remover



Red Line Giant Type  
Spark Plug

## Representative Jobbers, Send For Complete Sample Line Free

If every jobber in the country—who IS a jobber—could be personally acquainted with every successful product—that IS a successful product—automotive jobbers and manufacturers would both do a lot of business that is now going to waste.

That is why RED LINE, INC.—manufacturers of automotive products that sell—make it possible for jobbers, everywhere, to become personally acquainted with RED LINE Products absolutely without expense.

A COMPLETE sample line of RED LINE Products is waiting for you in our stock room. Your request by wire, letter or telephone will bring it to you straight. Dealers want them, and they sell.

Send for your free sample line today.

## DEALERS

## Read This Extraordinary Guarantee That Insures Your Profit on Every Sale

You may sell RED LINE goods to your customers with the positive statement that their money will be returned if goods are not entirely up to their expectations. We in turn will refund to you not your price, but the retail price paid you by the customer. We GUARANTEE your profit on every RED LINE sale.

There is a big present demand for Red Line Products already created for you—and a bigger one in the making. Stock from your jobber, or write for complete information.



Red Line Mohair Top and Lining Dye



Red Line Radiator Cement



Red Line Spotnamel



Red Line Leather Renewer

# RED LINE Inc. Grand Rapids, Mich.



## Here is Where a Tube Usually Pinches

*What is the Greatest Protection Against Tube Pinching—and Consequent Blowout?*  
**A LIBERAL OVERLAP!**

How many times have you had a perfectly new tube blow out because of bead or flap pinching? The slightest pinching is sure death to ordinary tubes.

Dural Tubes give the greatest protection against pinching because of the extra overlap. They're built like a bridge—with the most strength at the greatest point of strain.

In every Dural Tube, you get scientific construction of the finest "selected estates" rubber. There is extra strength in every point of Dural construction—they're built "full size" to prevent chafing and ripping.

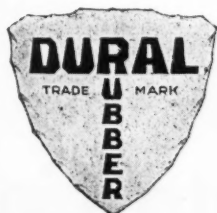
What's more, they're built so well that we *guarantee them against* valve leaks, splice peaks, porosity and losing their shape. Read the guarantee—then try them out.

### Dural Guarantee:

"We will replace free of charge any Dural Antimony Red Tube leaking at the splice, leaking at the valve joint, porous or out of shape, if it is returned to us within one year from date".

Car owners have learned that it pays to use better tubes—when you offer Dural Tubes, you know they can't secure a better tube at any price. Dural has a mighty attractive dealer offer—a line to the factory will bring full details.

*—and yet They Cost No More Than Ordinary Tubes*



# DURAL TUBES

DURAL RUBBER CORPORATION  
 FLEMINGTON, NEW JERSEY

# The trend of profitable truck business

AUTHORITIES on truck business are everywhere noting the trend of demand to the 3-ton capacity.

This is of the utmost importance to the dealer—for the sale of this size carries the greatest profit with the least service expense.

Today the F-W-D has the fastest growing market in this field. Month by month the factory is multiplying its output to fill orders coming from every part of the country.

With a service range covering that of any rear drive line from 2½ to 4 tons (and with trailer, 5 tons), with its proved saving of 40% in upkeep, with its compactness and easy operation, the F-W-D gives the dealer advantages which competition cannot meet.

We invite men who appreciate this larger opportunity in territory where the F-W-D is not represented, to send for our proposition.

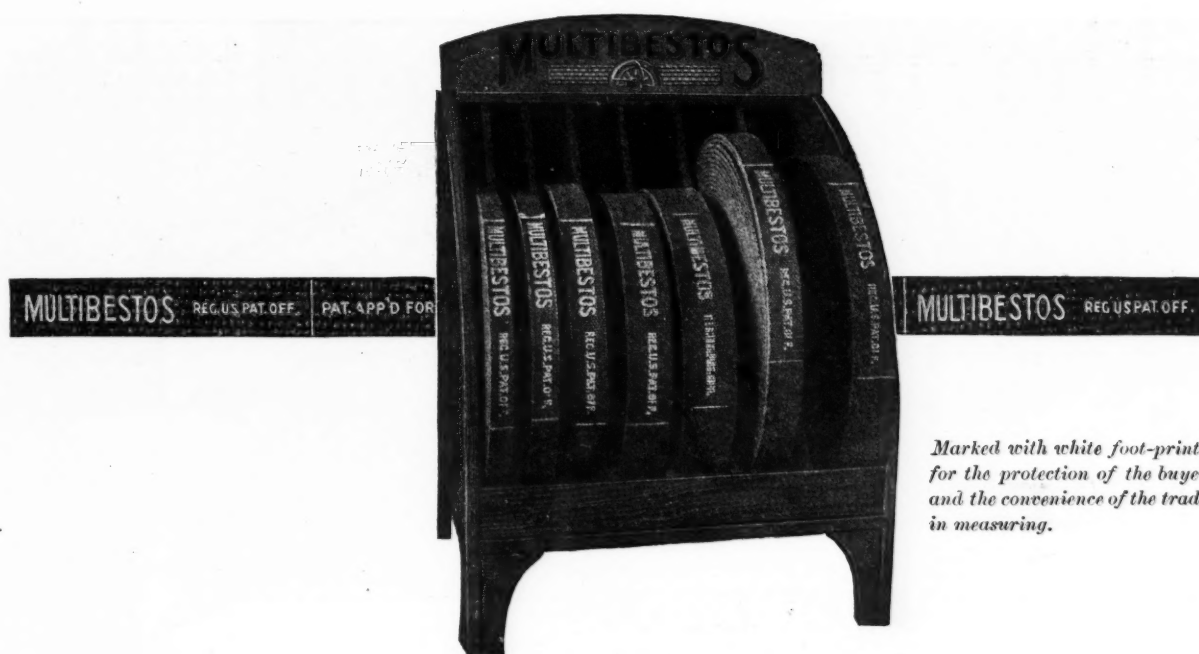
**A full line of F-W-D trucks will be exhibited  
at the New York Show, January 3-10**

## The Four Wheel Drive Auto Co.

Canadian Factory: Kitchener, Ontario

Dept. L

Clintonville, Wisconsin



*Marked with white foot-prints  
for the protection of the buyer  
and the convenience of the trade  
in measuring.*

## HOW MANY ROLLS?

**Y**OU can make a real saving and give an improved service by handling Multibestos in roll lots. It requires only about seven rolls to provide a range of sizes suited to the most popular cars and trucks in your vicinity.

With the Multibestos Cabinet you can handle your brake lining stock with the greatest ease.

No more wrestling with heavy rolls in a dark corner of the stock room; no more unrolling a fifty-foot length on the floor and measuring it with a yard stick—the white foot prints on Multibestos are an accurate means of measuring.

With the Multibestos Cabinet the sizes are all in place—right where you can get at them easily. Every sale is made quickly and to the satisfaction of all concerned.

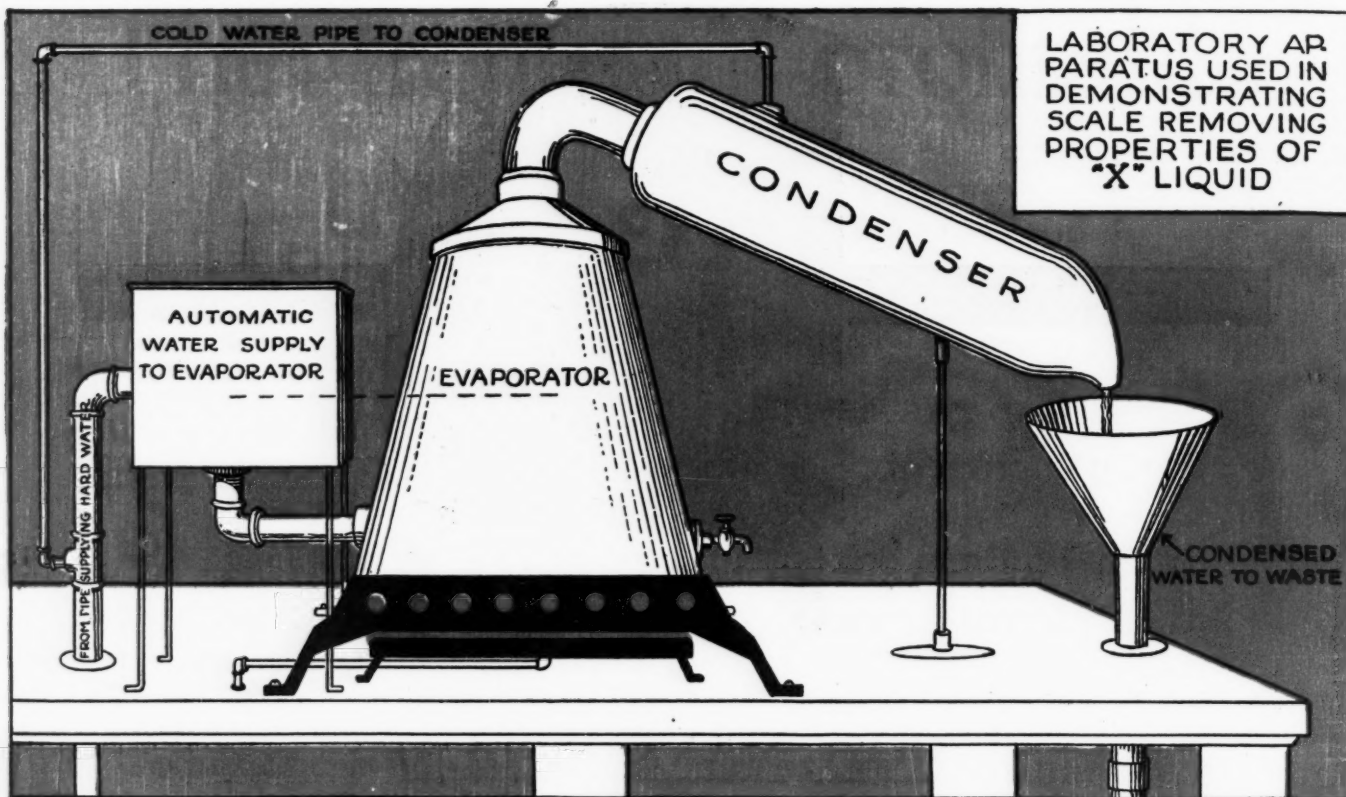
Multibestos, besides being a satisfactory and profitable line for the dealer, is of a high quality which gives the best service to the car owner.

Its adoption as standard equipment on leading cars proves this.

# STANDARD WOVEN FABRIC CO.

*Factory*

WALPOLE, MASS., U. S. A.



## Scale—The Destroyer of Engine Cooling Efficiency

### *How "X" Liquid Eliminates Scale*

**S**CALE is a hard deposit of lime and magnesia—two elements always present in water.

When you allow this scale to collect on the cylinder walls the heat of the engine is bottled up. As more and more scale forms, radiation practically ceases. The engine overheats, the lubricating film breaks down, and all sorts of engine troubles develop.

Scientific laboratory tests, confirmed by the experience of thousands of car owners, have proved that "X" Liquid not only removes scale already formed, but keeps *new* scale from forming.

Hundreds of thousands of motorists are safe-guarding the car's cooling system by keeping "X" Liquid constantly in the water.

"X" circulates freely with the water. It instantly and permanently repairs every leak—whether in the radiator, pump, water-jacket, connections, around the gaskets, etc.

"X" dissolves all the rust that is eating away the metal. By absorbing the free oxygen in the water, it prevents *new* rust from forming.

The cleansing action of "X" Liquid tones up the cooling system, saves oil and gasoline, and gets you *better engine performance*.

#### ***Not a Radiator Cement!***

Don't confuse "X" Liquid with radiator cements, flaxseed meals or other "dopes" in powder or liquid form. These clog the cooling system and often damage it. "X" is the only scientific process guaranteed to keep cooling systems **LEAKPROOF—RUSTPROOF—SCALEPROOF**—and troubleproof. Used by the U. S. Government, Standard Oil, American Telephone & Telegraph Company, etc.

**Standard Size . . . . . \$1.50**

Will do a \$25 repair job!

**Ford Size . . . . . 75c**

Over 3,000,000 cans of "X" Liquid have been sold. Over 25,000 progressive dealers now sell it. Many of them sell "X" *exclusively*.

#### **"X" LABORATORIES**

25 West 45th Street

New York City

Pacific Coast Branch: 450 Rialto Building, San Francisco, Cal.

TRADE MARK  
**"X"**

**Liquid** makes all water cooling systems  
**LEAKPROOF • RUSTPROOF • SCALEPROOF**



1. Section pressing outward and upward.
2. Spring section of ring.
3. Lower section pressing outward and downward.

THE DEWITT G. SALTSMAN  
CO., New Haven, Conn.

BEST DIST. COMPANY, Kan-  
sas City, Mo.

NATIONAL AUTO SUPPLY  
CO., Chicago, Ill.

CRESSY BROS., 979 Woodward  
Ave., Detroit, Mich.

J. E. BENEDICT CO., 1212  
Figueroa St., South, Los Angeles,  
Cal.

HARRY G. BOW, 715 Rose Bldg.,  
Cleveland, Ohio.

B. & S. DISTRIBUTING CO.,  
209 Mass. Ave., Boston, Mass.

**E**XPANDING in width and diameter the Wedge Rite Piston Ring snugly hugs the cylinder wall—at the same time completely fills the groove.

The two outer, soft gray iron bearing rings are pushed outward and upward by a wedge shaped inner ring of untempered spring steel making a permanent seal. It makes ring rotation impossible, so that Wedge Rites adapt themselves to the shape of the cylinder walls.

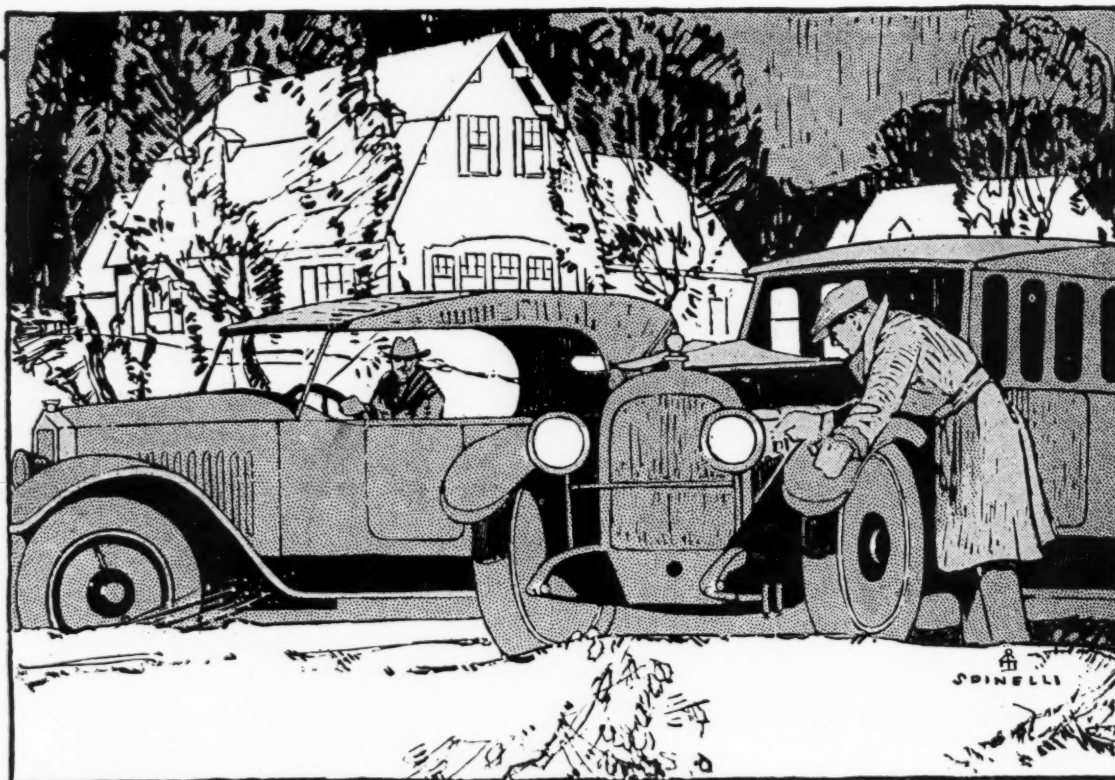
The wedge construction takes up wear. Install the Wedge Rite Piston Ring—the rings that put dollars back into the motorist's pocket that formerly went for oil and gas waste. Write for sales proposition.

**The Wedge Rite Piston  
Ring Co.**

PLATTSBURG,

Montreal, Canada

NEW YORK



**T**HERE is satisfaction in knowing why a motor refuses to "turn over" on a cold day. It may be battery trouble superinduced by too much work—pulling against cold, stiff lubricants. It might be other inward troubles of the motor for the same reason.

Most winter troubles may be eliminated by using the proper oil—of proper cold test. We suggest

## Supreme Auto Oil

as a cure for such troubles.

It flows freely at Zero—starts with the engine—gives instant lubrication—relieves the pull on the starter, likewise the battery. It leaves less carbon, hence less pre-ignition—you should use it.

Supplied by any dealer displaying the sign of the Orange Disc.

### GULF REFINING COMPANY

General Sales Offices: Pittsburgh, Pa.

#### DISTRICT SALES OFFICES:

New York  
Atlanta

Philadelphia  
New Orleans

Boston  
Houston

# BRUNNER

**B**RUNNER Air Compressors are the creation of careful unhurried workmanship; designed with full appreciation of garage air service requirements. Brunner engineers have studied the garage air service problem from every angle.

As a result the Brunner line of garage air compressors is the most dependable, economical and durable line on the market. And there is in this big line a unit or outfit to meet every service station condition or requirement.

Through the careful selection of materials and the adoption of the highest standards in manufacturing and inspecting, absolute accuracy and the proper strength in every part has been assured so that break downs are unknown and the upkeep cost is next to nothing.

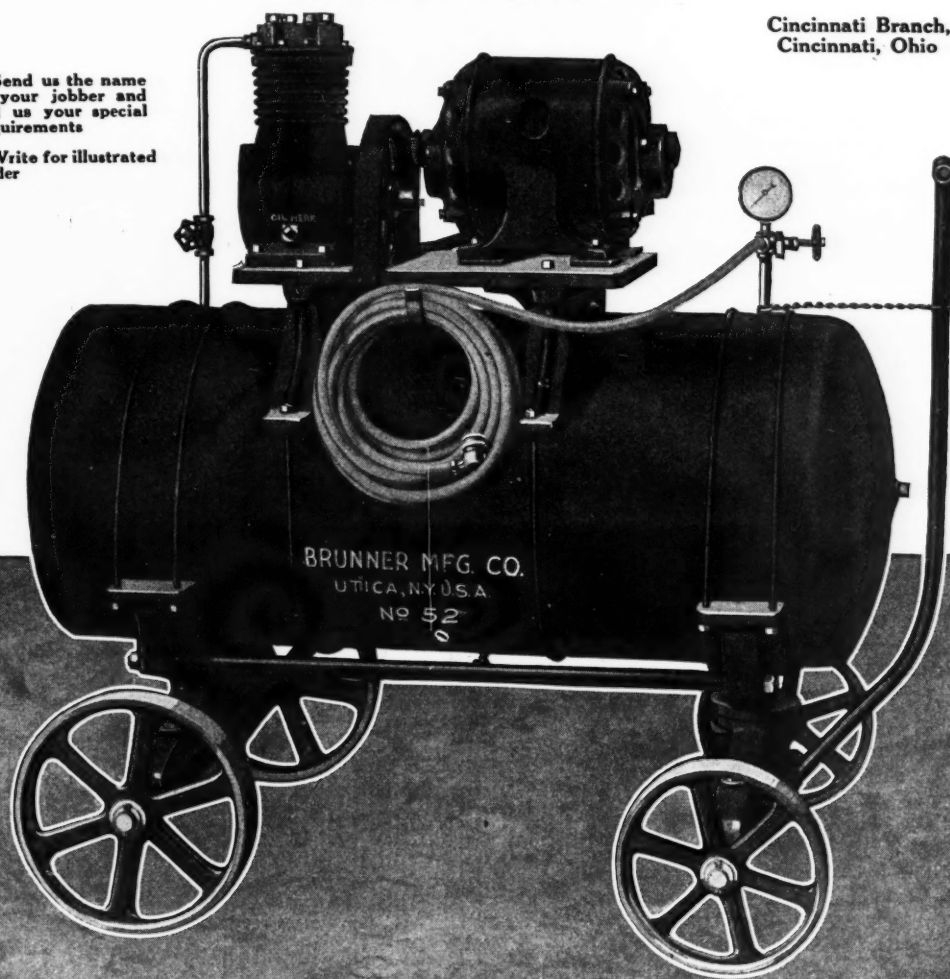
## BRUNNER MANUFACTURING COMPANY

Main Office and Factory, UTICA, N. Y.

Cincinnati Branch,  
Cincinnati, Ohio

Send us the name  
of your jobber and  
tell us your special  
requirements

Write for illustrated  
folder



# HAWKEYE

## MOTOR TRUCKS

**Make  
Every  
Road  
a  
Right  
of  
Way**

Hawkeye Trucks are built to stand the stress and strain of transporting capacity loads over unusual roads — doing it successfully day after day without much attention from the driver.

Better trucks mean busier trucks, and busier trucks are more profitable. It pays to sell a better truck like the Hawkeye. Mud—sand—hills—any road is a right of way to a Hawkeye.

Dealers will be supplied with satisfactory assurance that Hawkeye Trucks deliver as well as our promises. Write for information.

**Hawkeye Truck Co.**

R. A. Bennett, President

616 Sixth St.,

Sioux City, Iowa

### Quality Tested Units

Hawkeye Trucks are equipped with such well known quality tested units as the following:

**Buda Motor**

**Clark Internal Axle**

**Fuller**

**Transmission**

**Eisemann High**

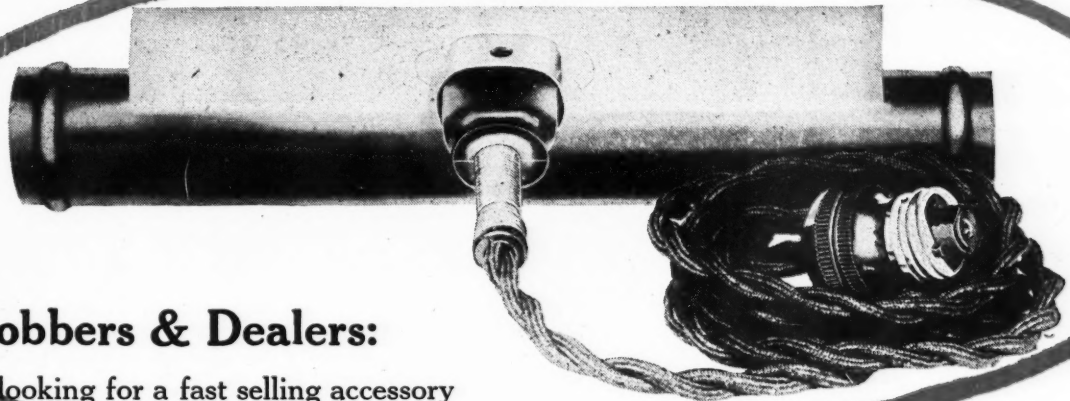
**Tension Magneto**

In addition, we make over 170 parts in our own new and well-equipped factory and know that they are properly made.



# MAYALL MOTOR HEATER

## A WINTER SALES WINNER!



### To Jobbers & Dealers:

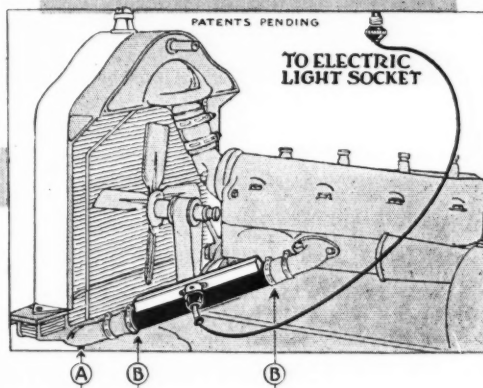
You're looking for a fast selling accessory for cold weather, aren't you? Here it is—one which sells on sight, in big volume—which is so efficient, so soundly designed, and so well made and finished that you can get behind it with all the strength of your selling organization. The product justifies you in going the limit.

December, January, February and March are the months for the Mayall Motor Heater. It sells clear through to April north of the Mason and Dixon line.

It's ready in big volume now for Fords—\$10.00. Types for other makes of cars are coming along fast.

Get ready for a Quick Ride. Wire collect your sample order. We'll back you to the limit, with full pages, 2-color advertising in Motor World, Motor Age, Auto Trade Journal and Ford Owner. Guaranteed for one year from date of installation. Adequate Jobbers' and Dealers' Discounts.

# \$10



It gives 95% heating efficiency.

Is installed right in the circulating system of the motor—by the car owner himself—in 5 minutes.

Insures instantaneous starting in any weather, in any garage. Attaches to any electric light socket. Maintains constant circulation. Heats the engine and radiator—thus warming the garage.

Eliminates danger from frosts.

Saves gasoline, batteries, backaches and sore arms. Sells for only \$10.00 and is guaranteed for one year.

Ford type now ready for delivery. For other cars soon.

**KNIGHT METAL PRODUCTS CO.**

251 East Willis Ave.

Detroit, Mich.

**MOTOR SUNDRIES LIMITED**

Foy Building

Toronto, Canada

**CLIP-MAIL!!**

**KNIGHT METAL  
PRODUCTS CO.**

251 East Willis Ave.,

Detroit, Michigan

Send me immediately descriptive literature on the Mayall Motor Heater.

Name .....

Address .....

I am a

**JOBBER**

**DEALER**

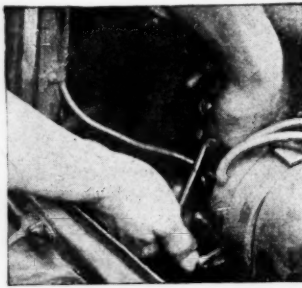




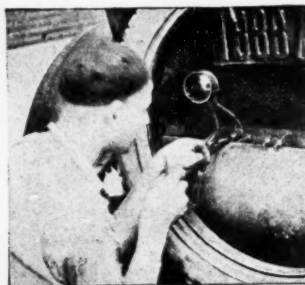
"For All Purposes  
It Fits in All  
Places."



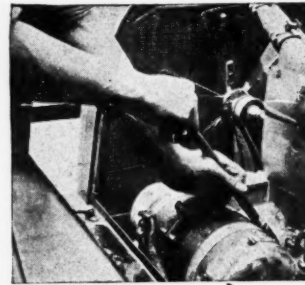
As a Tap Wrench



As a Socket Wrench



As a Screw Driver



As a Reamer

## The Handiest Tool You Will Ever Use!

It saves hours of time in tapping or reaming. No time wasted in disassembling obstructing parts. For all purposes the Alert Universal Tool fits into the hard-to-reach places.

The Alert is more than a tap wrench. It is a ratchet socket wrench, a ratchet screw driver, a ratchet valve grinder and it is used for various other purposes because its handle turns right or left or remains rigid at user's will.

With an extension, the Alert Universal Tool reaches into long narrow places—the kind over which you have "sweat blood." There is no end of uses to which this handiest of handy tools may be put.

The time saved in one mean job for which you would have been obliged to devise a makeshift, pays for one of the three sizes of an Alert Universal Tool.

Of sturdy construction and made of finest materials throughout. You have already paid for it in time lost; why not stop the little time leaks that destroy efficiency, and buy an Alert Universal Tool today. Ask your dealer or order direct.

### LIST PRICES

No. 1—Cap. 1/16 to 3/16....	\$2.00
No. 2—Cap. 1/8 to 5/16....	2.00
No. 3—Cap. 3/16 to 1/2 ....	2.50
No. 5X—Extension Cap., 1/8 to 5/16.....	1.50
No. 6X—Extension Cap., 3/16 to 1/2.....	2.00

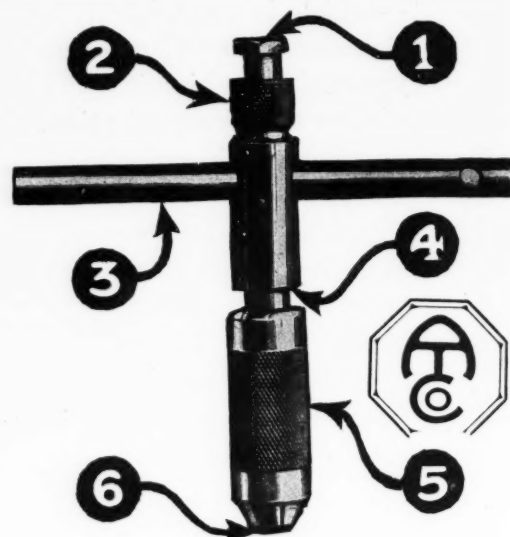
Prices of other types upon application.

**JOBBER AND DEALERS: Get our special, easy-to-sell proposition. Big profits and sales helps.**

### ALERT TOOL COMPANY

Toolmakers' Specialties.

237-39-41 North Sixth Street,  
Philadelphia, Pa.



- 1 Hex thumb—rest against which pull is exerted to disengage gear and pinion.
- 2 Knurled sleeve gives firm hold; allows perfect starting action.
- 3 Adjustable cross-bar brings corner work into the open.
- 4 Under here are gear and pinions that afford the advantages of the ratchet principle, yet avoid its shortcomings.
- 5 Knurled sleeve with extra long bearing covering the body with its gear and pinion.
- 6 Chuck with square broached jaws insures firm grip and true chucking of tap.

# ALERT UNIVERSAL WRENCHES



**One-Twentieth  
of One Percent  
Is an Adjustment  
Record to Be  
Proud of**

*But More Than That, It  
Is the Most Convincing  
Proof That Could Be  
Offered Of the Enlight-  
ening Results Produced  
By the New Method Of  
Internal Hydraulic Cur-  
ing.*

**T**HE new way of producing National Speedway Tires—by internal hydraulic expansion—has had a rousing vindication. That adjustment average we spoke of has not increased by the smallest fraction, since the day we first disclosed it. It still stands at **one tire out of every 2000 sold.** One-twentieth of one per cent.

For National Speedway Tires—made proof against structural defects by the new curing process—are serving out long terms of trouble-free usefulness. **They go the limit.**

Such a stay-on-the-job tire is a business builder of rare power. The kind of trade it wins is the most stable trade in the world—**continued patronage.** A National Speedway makes good on every promise. It **keeps** its friends.



## Ironing the Kinks Out of the Tire Business

**T**IRE buying, and consequently tire selling, has always been rather precarious. It is made so by the universal method of external-pressure curing. You never know what kind of a tire will come out of the mold.

This uncertainty makes the tire purchaser cling tight to his adjustment guarantee. His tire may last 6000 miles; it may last 600. It's a speculation. **Who knows?**

This game of chance may afford entertainment to the amused bystander (if there is such), but it works a hardship on the dealer, and on the consumer. The dealer must take the kicks.

It's rough going.

## No Such Trouble With National Speedway

It is a welcome relief to handle National Speedways. They smooth out the bumps in your Sales path—make easier traveling.

For you know that they haven't been damaged in the mold; no hidden flaws to create mischief after a few miles of service. If there's anything wrong with a National Speedway, it shows on the **surface**. And that tire will never leave the factory.

This is the Tire That Discarded Traditional Practice  
and Came Structurally Perfect From the Mold

*Distortion Under Mold Pressure, So  
Prevalant in Many Makes of Tires,  
is Entirely Eliminated*

**T**HE discovery of Internal Hydraulic Expansion will save American car owners many thousands of dollars each year.

It has put an end to structural flaws, for good and all.

You know how tires are ordinarily made—built up on a solid iron core, and then placed in a heavy iron mold to be squeezed into shape (or out of it) between two enormous jaws, under a crushing external pressure of 150,000 to 300,000 pounds.

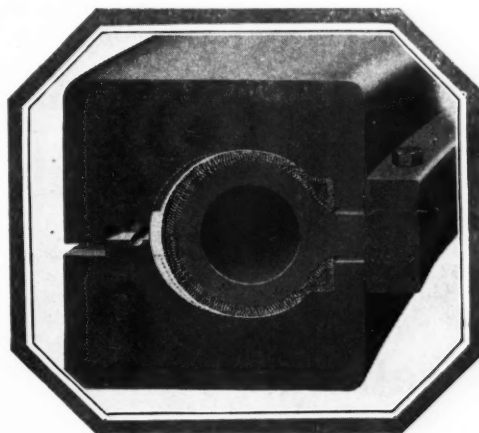
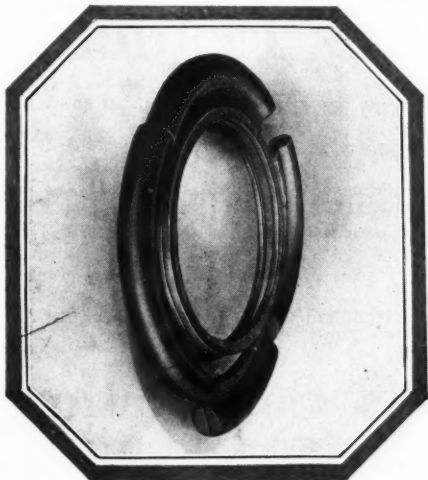
Imagine what happens when the soft, uncured casing becomes a trifle displaced: mold pinch, fabric bruises, rim cuts; first-rate material for premature blowouts.

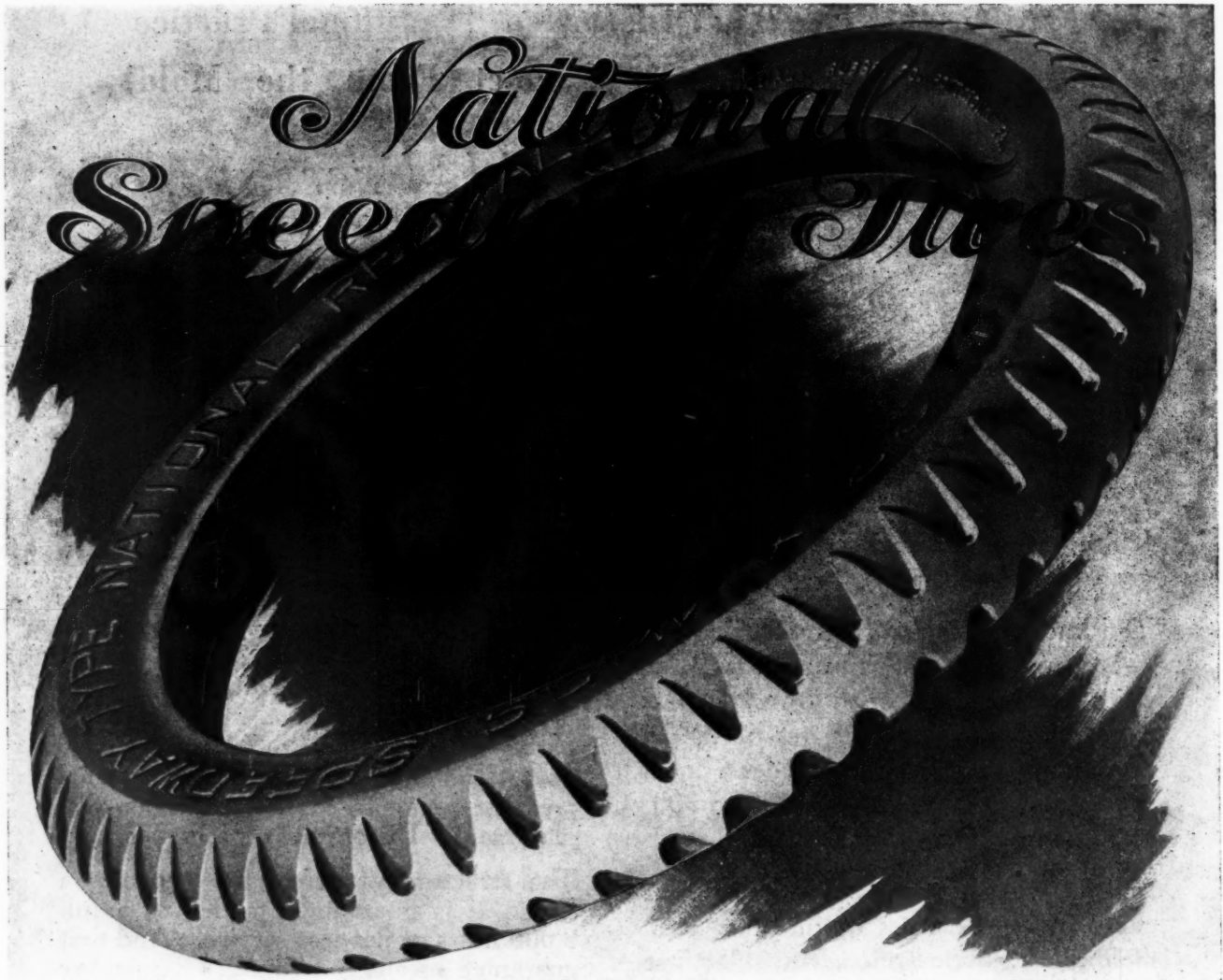
The New Method

National Speedway is built on a **collapsible core**—one that can be taken apart and removed before the casing goes into the mold. The two jaws close over the casing without an ounce of pressure.

Then a specially constructed inner tube is placed in the tire, and subjected to an **internal water pressure of 200 lbs. to the square inch**. This powerful **EXPANSION** is maintained during the entire period of curing—and the tire is molded into a solid unit. The entire absence of any external pressure prevents fabric or rubber displacement. **Distortion is impossible.**

The structurally perfect tire becomes a **Fact**. It is guaranteed to deliver a full 6,000 miles of flawless service. And that guarantee **means** something: Remember the one-twentieth of one per cent!





## The National Speedway Franchise

**A** TIRE BUSINESS that would maintain a steady forward pace—a growing business—must show a mounting list of patrons who repeat their calls.

You get that kind of patronage when you give continued satisfaction.

Only a tire that is uniformly fine can win such a trade.

The tire that is good at one time, and bad another, is an unstable foundation upon which to build your hopes.

The great value of National Speedway lies in its consistent quality.

ALL National Speedway tires are fine tires. The internal hydraulic process prevents the disheartening variations in quality that add so to the dealer's burden of troubles.

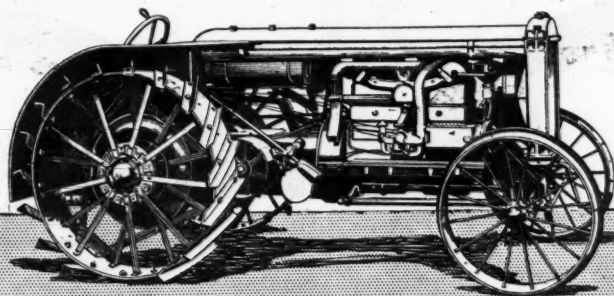
The National Speedway distributor secures an exceptional franchise. Exceptional not only in the character of the product, but in the partnership agreement we make with him.

If you don't know about this agreement, write for the details. Haste is essential, to avoid disappointment as to territory.

### National Rubber Products Corporation

660-662 N. Broad Street.

Philadelphia, Pa.



# Start the New Year Right

A YEAR of prosperity is ahead for the dealer who selects the right line of farm tractors. The Allis-Chalmers Mfg. Co., has spent \$3,000,000 in four years to make their tractors right. It has millions more to spend for service and development work.

## ALLIS-CHALMERS FARM TRACTORS

*The 18-30 is a powerful, scientifically built farm tractor designed to do the heaviest work with the greatest ease. It will pull four 14-inch bottoms. Frameless construction—removable cylinder sleeves.*

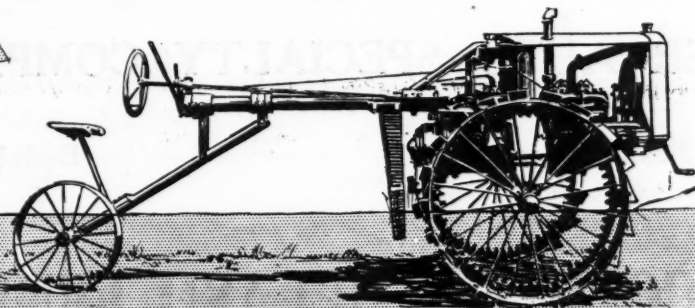
**Now \$1,785—Was \$1,985**

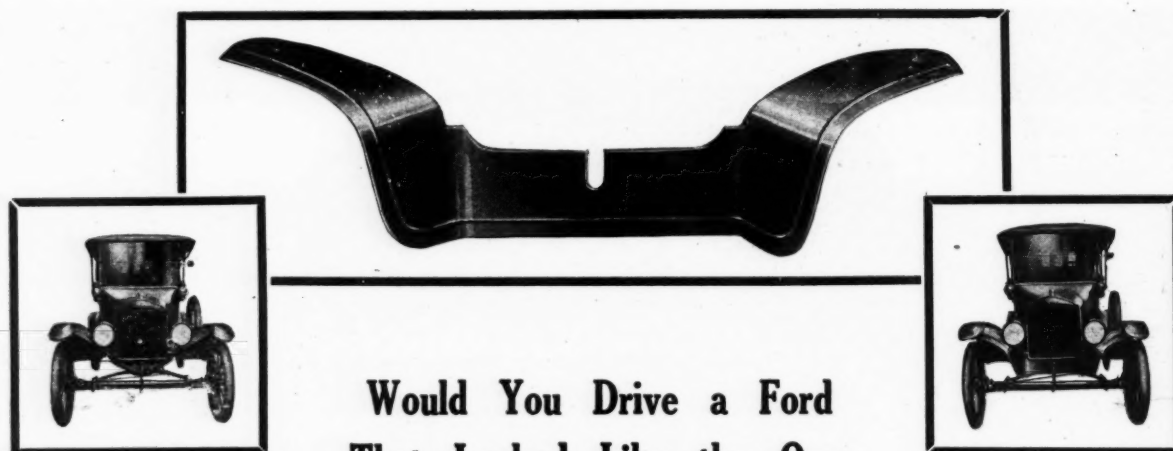
Allis-Chalmers Farm Tractors are made complete, except carburetor, magneto and spark plugs, in the Allis-Chalmers plant. They are made *right*. For 65 years the Allis-Chalmers Mfg. Company has been one of the leading manufacturers of high-grade machinery in the country.

**Dealers:** Immediate action is necessary if you desire to qualify for this line of farm tractors. Profitable territory is being apportioned rapidly. There are several good fields still open. Write immediately for full details—*write right now*. Address your inquiry to Dept. M. A., Tractor Division, Allis-Chalmers Mfg. Co., Milwaukee, Wis.

*The 6-12 is a one-man outfit—operator rides over implement or on implement seat. This is a general purpose tractor with plenty of power—1,000 lb. pull at drawbar—pulls one 16 in. plow or two 10-in. or 12-in. gangs—26½ in. clearance for cultivating. Price 795.*

**Allis-Chalmers Mfg. Co., (Tractor Division) Milwaukee, Wis.**





**Would You Drive a Ford  
That Looked Like the One  
On the Left**

We think not—

You would certainly want your car to look as fine as the Ford on the right — which means merely the addition of a single part—the Masco Ideal Splash Fender.

You would put this fender on to make driving safer in mud and snowstorms—for without it Ford lights are soon mud-splashed or snow-blinded. Mud flying into the radiator doesn't help it, either.

The dirty, mud-baked under-parts of your car would not be exposed as they are on most Fords—parts that can't be kept clean—for you

would soon exchange \$6.50 for a Masco Ideal Splash Fender that would add "class" to your Ford and give the front the needed protection.

In five minutes you would have this strong, substantial fender clamped securely on the car. It fits 1917, 1918, 1919 models.

Now, what about all the Ford owners in your town. They want and need Masco Splash Fender. Stock and display the Masco Ideal. If your jobber can't supply you, write us direct, giving jobber's name.

## **MAYER AUTO SPECIALTY COMPANY**

*Makers also of the Vacuum Air Cooler*

452-54 Ellicott Square,

Buffalo, N. Y.

# **MASCO IDEAL SPLASH FENDER**

**FOR FORDS**



**LISTEN!**  
IT  
STOPS THE KNOCKS

**NEVER-KNOCK  
CARBON REMOVER**

Saves Gasoline  
Greatly Increases Power

PRICE 50¢ 75¢ \$1.00

Made by THE LIQUID VENEER PEOPLE



# BANG!!

# BANG!

# BANG

# BANG

# BANG

# BANG

purr-r-r-r-r-r-r

# "Oh, Boy!"

# THAT

## NEVER-KNOCK CARBON REMOVER

Sure does put the "pep" into that motor and drive away all the knocks!" That's what they all say, once they have used this remarkable discovery in carbon removers.

Just think, it removes over 25% more carbon than any other preparation. Will dissolve more carbon in an hour than other preparations dissolve in ten and will give better results. Positively will not harm motor in any way.

Just pour into cylinders through spark plug openings as per directions, that's all. Apply once a month and keep your engine running as sweet and powerful as when new. Saves gasoline, greatly increases power. Satisfaction guaranteed or money refunded.

For 4 cylinder engine, get 5 oz. can, 50c. For larger engines, 10 oz. can, 75c or 15 oz. can, \$1.00. At all dealers or sent direct. Remember, Neverknock the genuine. Nothing like it.

**BUFFALO SPECIALTY CO.**

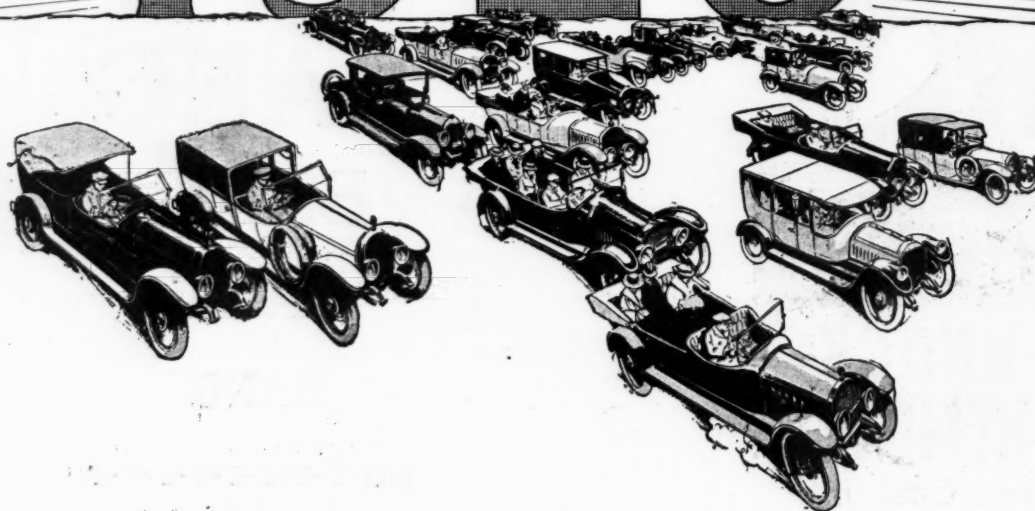
Also Makers of RADIATOR NEVERLEAK

**"The LIQUID VENEER People"**

395 Ellicott St.,

Buffalo, N. Y.

# 1920



## The biggest year in the brake lining business

*How much of the 53,000,000 feet of brake lining needed for 1919 did you sell?*

**I**N 1918 there was one automobile for every 18 persons in America.

In 1919 there are over 6,000,000 cars and trucks which have been in service for over one year.

1920 promises to be the biggest year in the history of the automobile industry.

If 53,000,000 feet of brake lining were needed in 1919—dealers can appreciate the phenomenal sales that 1920 will offer.

### *The national brake inspection movement*

With the increase of motor vehicles and the increasing traffic and safety problems that are confronting the country, the necessity of brake legislation is emphasized.

Police chiefs in towns of 2500 population and over, are supporting the movement for efficient brakes.

Newspapers everywhere are urging motorists to be sure of their brakes. The Thermoid Chart of Stopping Distances, now the Police Traffic Regulation Chart, is being given widespread notice by police chiefs as well as by automobile officials.

### *Dealers should capitalize this movement*

Good brakes are dependent upon the most efficient brake lining—car owners appreciating the imperative need of safe brakes are bound to have their brakes inspected—and relined if necessary.

There is a big business ahead for all Thermoid dealers, because Thermoid is the one brake lining that is tied up to the brake inspection movement. It is the one and only brake lining that assures satisfaction to both dealer and customer.

Get your share of this profitable trade. Thermoid is the best known and fastest selling brake lining there is. It will build permanent good-will for you by giving your customers lasting service.

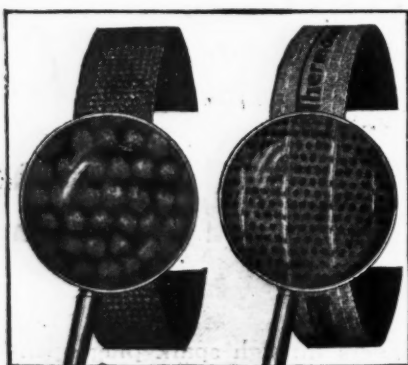
### *The famous Thermoid guarantee*

Every foot of Thermoid Brake Lining is backed by our guarantee: *Thermoid will make good—or WE WILL.*

### **Thermoid Rubber Company**

Factory and Main Offices: Trenton, N. J.  
New York, Chicago, San Francisco, Detroit, Los Angeles, Philadelphia, Pittsburgh, Cleveland, Boston, London, Paris, Turin.

Canadian Distributors  
The Canadian Fairbanks-Morse Company, Limited, Montreal  
Branches in all principal Canadian cities



#### **Ordinary Woven Lining**

*Notice the loosely woven texture.  
Wears down quickly and unevenly.  
Loses its gripping power as it wears.*

#### **Thermoid Hydraulic Compressed Brake Lining**

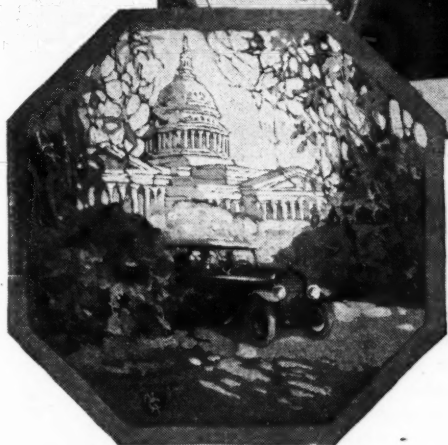
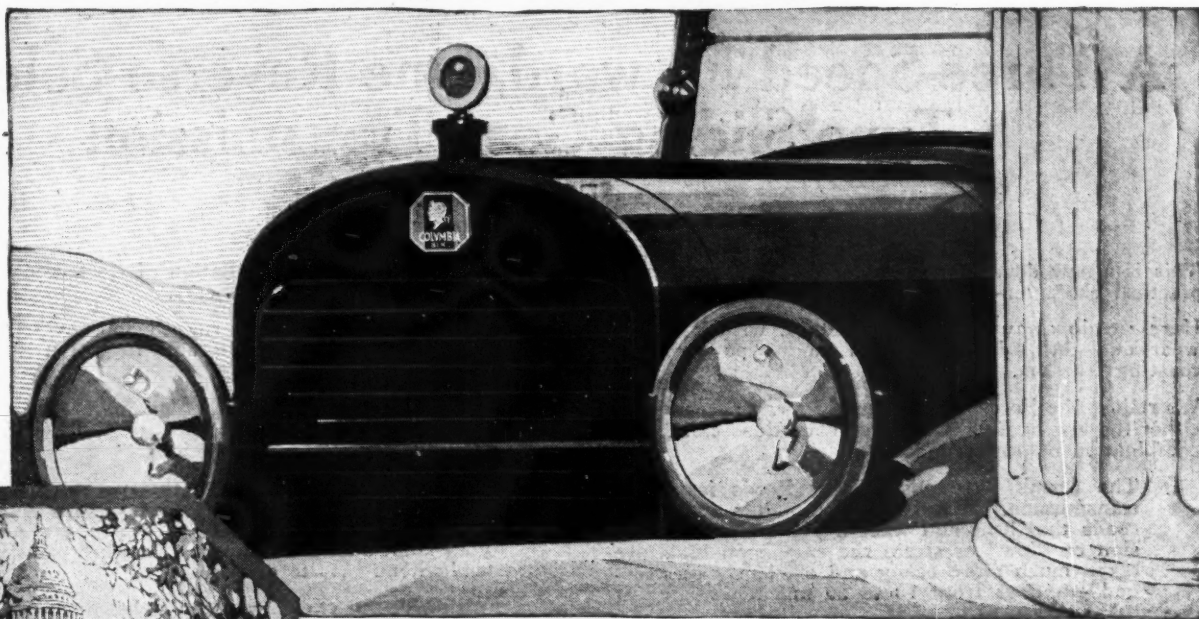
*Notice the compact texture.  
Wears down slowly.  
Gives uniform gripping surface until worn wafer thin.*

# Thermoid Brake Lining

## Hydraulic Compressed

Makers of "Thermoid-Hardy Universal Joints" and "Thermoid Crolide Compound Tires."

# Columbia Six



## Good ALL the Way Through

Chief among the reasons why the Columbia Six has, during the past five years, gained a place among the ten leading makes of cars in this country is this—It is built well *all* the way through.

The Columbia Motors Company have never built a failure—never have had a “poor year”—because from the outset they have held to the standard of *thorough goodness*.

To our knowledge, no Columbia Six owner has ever become dissatisfied with his purchase.

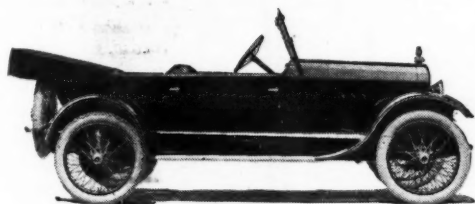
Every part of the Columbia Six is acknowledged by men who know motors cars to be as good as can be bought or manufactured. There is not one exception to this rule even to the smallest details.

This, naturally, results in remarkably low depreciation and operating costs.

The reputation of Columbia Six parts *plus* scientific assembly by Columbia engineers will prove this “good *all* the way through” quality to you.

Ask any Columbia owner—inspect a Columbia Six—ride in it and drive it.

**COLUMBIA MOTORS COMPANY**  
DETROIT, U. S. A.



### TO YOU

Few cars in America are more often and better thought of than Columbia Six.

Reason one—a sound, “good clear through” automobile.

Reason two—a wise and forceful sales promotion plan.

To automobile agents, present and future, who desire to build a permanent and increasingly profitable business, we shall be glad to discuss these reasons in detail—and to explain the Columbia Six sales agreement.

*Gem of the Highway*



# CRONK SIMPLEX SLIDING GEAR TRANSMISSION *for FORDS*

## A Three-Speed Forward, One Reverse Selective Type Sliding Gear Transmission FOR FORDS

This is a new development—a radical refinement of a most practical character—and so it is well worth investigating.

Here we do away with the planetary, with its bands that wear out—that “drag back” on engine power and retard coasting freedom.

We relieve the Ford owner from the mean necessity of using either the low or high gear when conditions call for a better combination of power and speed.

The Cronk Transmission for Fords is a real transmission. It will stand up. Hills and rough roads that heat and wear a planetary transmission on “low” or strain the engine on high, are taken much more easily and efficiently on “second”—and at from 10 to 20 miles per hour at that.

You show a Ford owner this wonderful three-speed transmission. Let him handle the simple “cane shift” in low, intermediate, high and reverse. Show him why he won't have to longer hold down the clutch pedal with his foot for weary miles. Tell him that he doesn't have to court accident by taking bad hills at a high speed. Show him more speed at less expense of fuel.

The Cronk Simplex Transmission for Fords gives the engine its fullest expression of power, flexibility, speed and economy. It gives the driver the same control used on higher powered cars in general.

Foot brake on jack shaft back of transmission is free from oil and radiates heat perfectly. Raybestos lined. No cotton lint to foul spark plug or clog oil tubes.

Design allows for installation of electric starter on old cars in same manner as 1920 cars.

This transmission is a rugged job—oversized nickel steel gears. Can be installed and forgotten so far as future trouble is concerned.

Saves rear axles by eliminating jerks they receive in dropping from low to high. Installation easy—no cutting or machining—just an assembly job.

**DEALERS**—When you get the full story on this transmission the selling possibilities in your territory will become large. Our arrangements with you are made direct and your additional profit on original Ford parts removed is also a big item. Write or wire.

Write for our exclusive State rights distribution proposition. We are looking for men of vision and action.

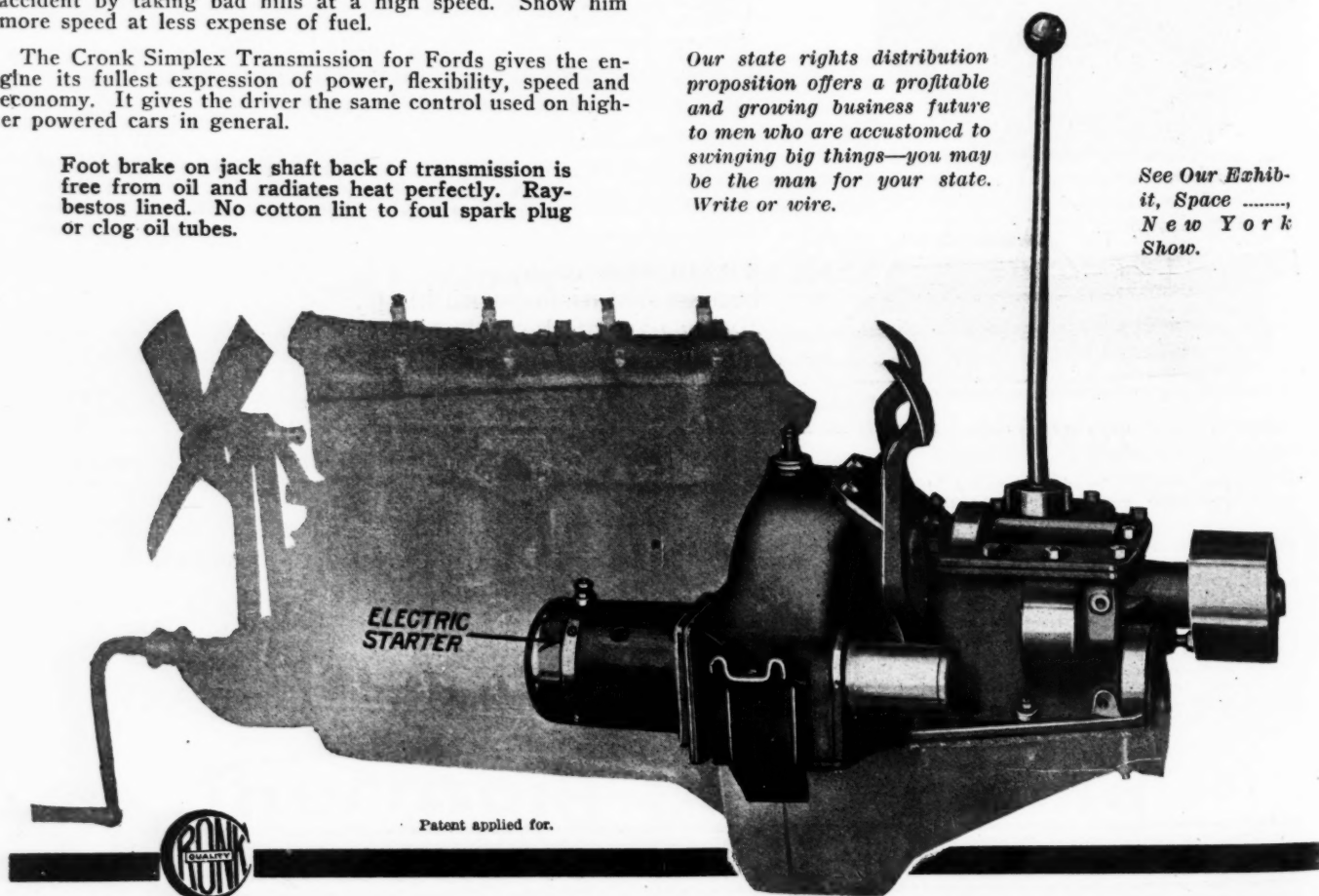
**E. D. & A. F. Cronk, Inc.**

Utica,

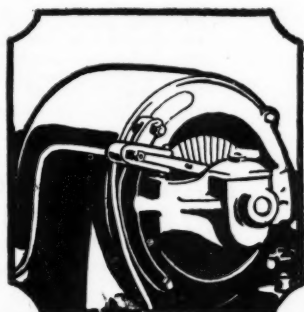
New York

*Our state rights distribution proposition offers a profitable and growing business future to men who are accustomed to swinging big things—you may be the man for your state. Write or wire.*

*See Our Exhibit, Space .....  
New York Show.*



# Two Stage *Usaco* Air Compressors



## The USACO Patented Unloader

Avoid Burned Out Motors, Blowing of Fuses, Etc.

When the desired tank pressure is attained the motor is automatically stopped and air exhausted from the auxiliary tank.

In pumping again, the motor starts without load and gradually picks it up as the pressure raises. It is positive and fool-proof as the release stage in the "open" position until the motor attains normal speed, preventing overloading—the common cause of motor trouble.

**Usaco**  
AIR COMPRESSORS  
TRADE MARK

The Usaco Line contains both Two-stage and Single-stage Compressors, suitable for any garage air service that exists.

## A Greater Unit for a New Era

Adapted for Pleasure Car or Truck Tires.

Just as the Standard De Luxe Compressor anticipated the demands of a few years ago, this new Giant Usaco comes forward girt with ability to meet the more severe requirements of a new era.

Giant Truck tires, now extensively used and being adopted on an ever ascending scale, require service greater than that for which the average compressor is capable. The ever growing use of automobiles confronts free air plants with unprecedented demands for service.

Many successful compressors of a few years ago can no longer be seriously considered. Good judgment now demands equipment, not only suited to the present high demands, but with surplus capacity and enduring qualities equal to the greater demand sure to come.

The Giant is just such a machine. With larger compressing and storage capacity than ever before available, it is the most capable, most refined, most highly automatic, most enduring and most nearly fool-proof air unit ever perfected.

# The United States Air Compressor Co.

6534 Carnegie Ave.

Cleveland, Ohio

# All You Have to do is READ

## Dealers—

Did you know that the  $\frac{3}{4}$  Ton Rainier is a Continental-Brown-Lipe-Timken Truck? That the 1 Ton Rainier has straight-line drive from motor to rear axle? That the  $1\frac{1}{2}$  Ton is a Worm Drive? And we challenge you to find a rival to the Rainier two-tonner at \$2400. Specifications of the Rainier Worm-Drive models tell their own story to you men who know trucks. Distribution rights are still to be had for the Rainier to live dealers who can SELL—much fine territory is open. Write for complete details regarding liberal contract terms.

### The $\frac{3}{4}$ Ton Rainier Continental- Brown-Lipe-Timken Truck, \$1750

MOTOR—Continental Red Seal.  
IGNITION—Simms or Bosch magneto.  
CLUTCH—Brown-Lipe multiple-disc, dry.  
TRANSMISSION — Brown - Lipe Model 25.  
REAR AXLE—Timken worm and gear.  
SPRING CONSTRUCTION — Patented double safety shackle on front end of rear springs.  
CARBURETOR — Zenith, with Stewart Vacuum System and Monarch Governor.  
WHEELBASE—125 inches.  
LOADING SPACE—Ninety inches.

### The $1\frac{1}{2}$ Ton Rainier at \$1975 Has a Worm Drive

MOTOR—Continental Red Seal.  
IGNITION—Simms or Bosch magneto.  
CLUTCH—Brown-Lipe multiple disc, dry.  
TRANSMISSION — Brown - Lipe Model 25.  
REAR AXLE—Sheldon worm and gear.  
SPRINGS—Double Safety Shackle on front end of rear springs.  
CARBURETOR—Zenith with Stewart Vacuum System and Monarch Governor.  
WHEELBASE—133 inches.  
LOADING SPACE — Nine to ten feet.  
This  $1\frac{1}{2}$  ton worm-drive Rainier sells at \$1975—chassis price.

## These Specifications

Compare this  
2 Ton Rainier with  
Anything on the  
Market—\$2400

MOTOR—Continental Red Seal.  
IGNITION—Simms or Bosch magneto.  
CLUTCH—Brown-Lipe multiple disc, dry.  
TRANSMISSION — Brown - Lipe Model 25.  
REAR AXLE—Sheldon worm and gear.  
SPRINGS—Double Safety Shackle on front end of rear springs.  
CARBURETOR—Zenith with Stewart Vacuum System and Monarch Governor.  
WHEELBASE—147 inches.  
LOADING SPACE—11 to 12 feet.

## RAINIER MOTOR CORPORATION

Sales Department:

225-227 W. 58th St., N. Y. City

Factory:  
Flushing, Long Island, N. Y.

# Rainier

## WORM-DRIVE DELIVERY TRUCKS

$\frac{3}{4}$  Ton - - \$1750

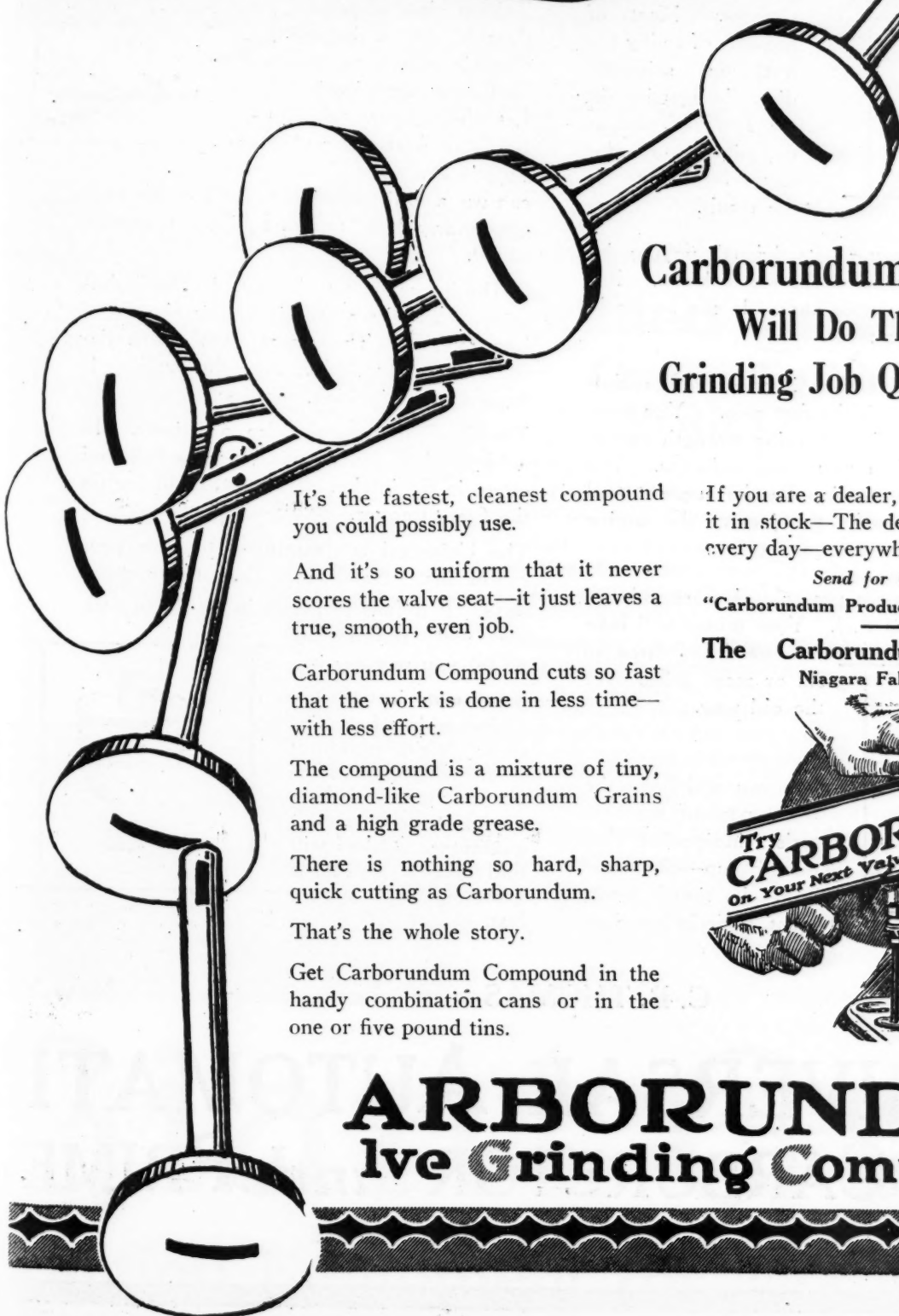
1 Ton - - \$1875

$1\frac{1}{2}$  Ton - - \$1975

2 Ton - - \$2400

Chassis Price

Open, Express and Panel Bodies carried in stock.



## Carborundum Compound Will Do That Valve Grinding Job Quicker, Easier

It's the fastest, cleanest compound you could possibly use.

And it's so uniform that it never scores the valve seat—it just leaves a true, smooth, even job.

Carborundum Compound cuts so fast that the work is done in less time—with less effort.

The compound is a mixture of tiny, diamond-like Carborundum Grains and a high grade grease.

There is nothing so hard, sharp, quick cutting as Carborundum.

That's the whole story.

Get Carborundum Compound in the handy combination cans or in the one or five pound tins.

If you are a dealer, see that you have it in stock—The demand is growing every day—everywhere.

*Send for Circular*

"Carborundum Products for the Garage"

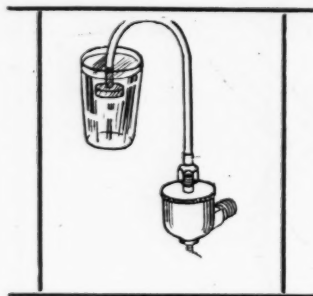
**The Carborundum Company**  
Niagara Falls, N. Y.



# ARBORUNDUM

## Ive Grinding Compound

## Do You Know A Motor Gets Acute Indigestion?



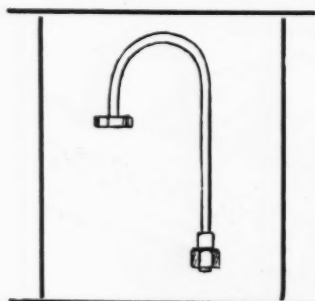
Giving the motor the water cure

Feeding gasoline to a motor is a delicate process. Most of the cars of today are not on scientific diet. Indigestion in the form of carbon deposits and decreased mileage is the result.

The motorist never gets through paying the bills for this kind of motor sickness. But there is a permanent cure. It can be made at almost no expense.

Re-mixing the gas as it goes from carburetor to cylinder is the first step. You want a "lean mixture" of varying strength except at starting, when you need rich gas. The Universal Automatic Re-Carburetor and Primer re-mixes the gas just as the engine demands it.

The result is more power and more mileage to the gallon of fuel. Your motor will hike mileage from three to six or more miles over the old way.



-generator

But you still have the worst part of the motor's indigestion to doctor up—the carbon. Its simple treatment, done in less than

5 minutes with the Universal Re-Carburetor.

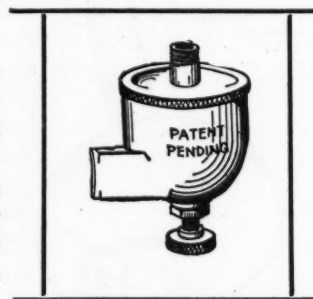
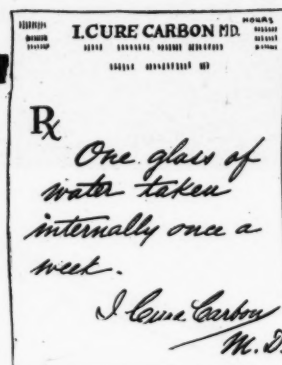
Take a glass of water. Attach the Universal Oxy-Generator to the Re-Carburetor intake. Let the motor, while hot, turn over fast and suck in the water. You can use a squirt can just as well as the oxy-generator, which is extra equipment, costing \$1.00.

The hot water put through the Re-Carburetor, when the motor is hot, is converted into oxygen. The oxygen will clean the motor out very nicely. Also the muffler. It improves the ignition, too.

The Re-Carburetor is also a Primer. In cold weather, put gasoline, or gasoline and ether, in the intake. The motor will fire on the first turnover.

The Universal is guaranteed to cure your motor ills. Install it. Test it for thirty days. If it fails to prove its worth to you, we will return the \$5.00 you pay for it.

You can install the Universal in a few minutes. Write us about it, or order one and begin your test now. You are protected by our guarantee. Dealers will find this a profitable accessory that moves fast.



The Universal Automatic Re-Carburetor and Primer

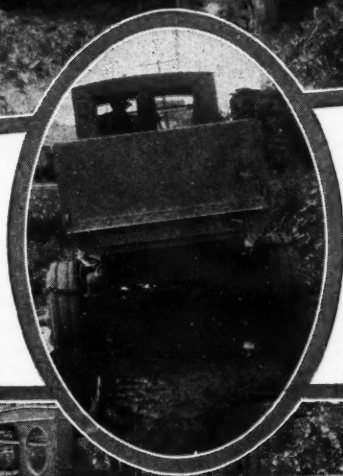
Geneva

C. B. THOMAS

New York

# The UNIVERSAL AUTOMATIC RE-CARBURETOR and PRIMER

for Automobiles, Motor Trucks, Tractors



## Stalled in Deep Mud Out in Two Minutes With Giant Grips

**T**HIS powerful truck stalled in the soft mud because the tires could get no footing. The driver attached Giant Grip chains and the truck pulled out in two minutes.

Giant Grip Traction Equipment is increasing haulage efficiency the country over. It gives positive traction in any emergency through mud, snow, sand, gravel and over icy stretches of road.

Clamps are permanently attached to the wheels and will outlast the truck. Cross-chains and hooks kept in the tool box when not in use. At a stretch of "bad going" the driver simply hooks on the chains with his bare hands. Two minutes' time and the truck is on its way—no jacking up the wheels or moving the truck around—no tools to attach the chains.

We are telling truck owners and operators the advantages of Giant Grip Traction Equipment through powerful advertising in national publications.

Link your store up with this effective campaign. Take advantage of our dealer service by adding Giant Grip Traction Equipment to your stock. Fewer models to carry than in any other line, but a size and style to fit every truck and type of wheel. Write to us for full particulars today. Dept. 14

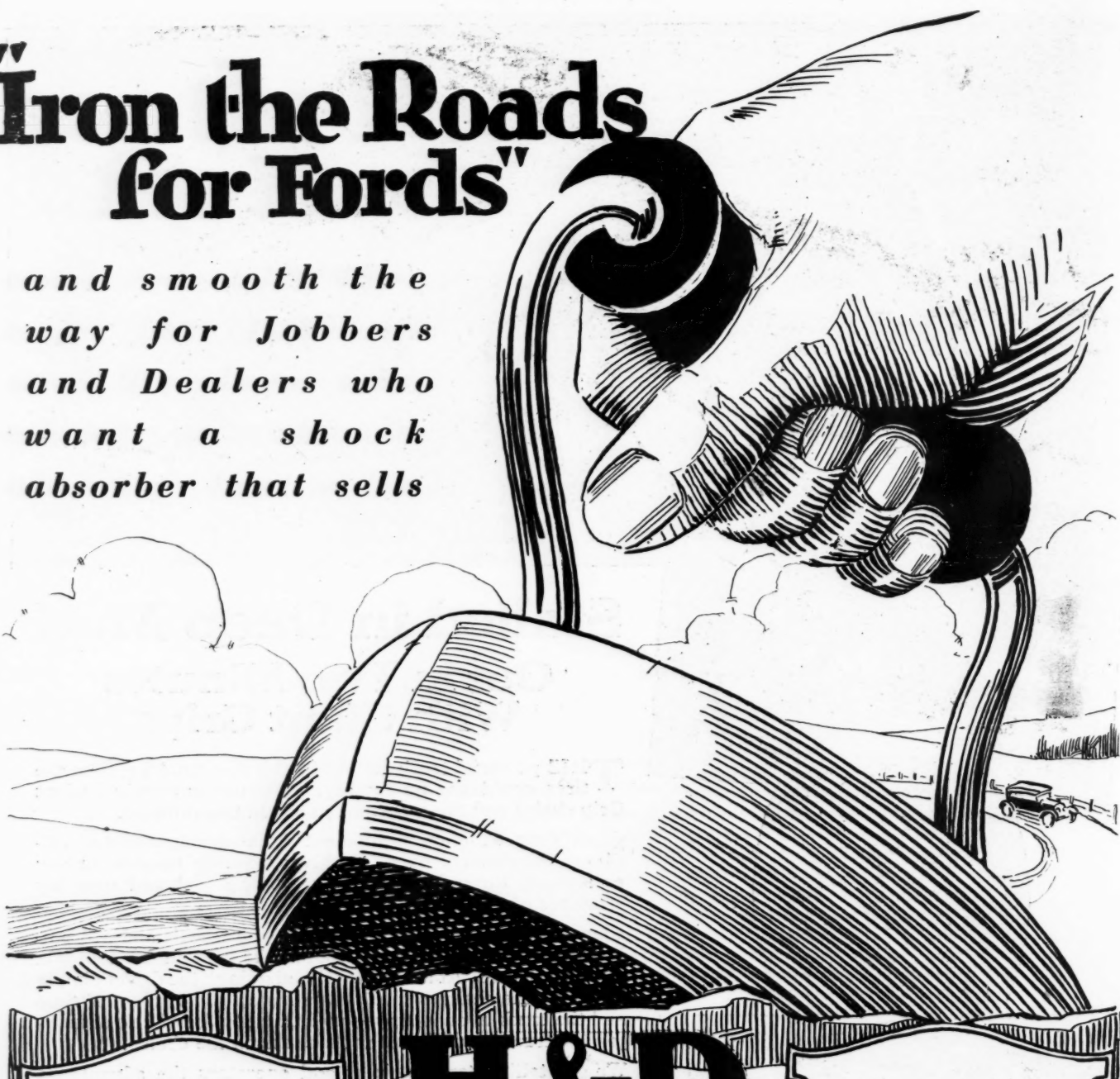
**Challoner Company**    Established 1863    **Oshkosh, Wis.**

# Giant Grip

## Traction Equipment for Motor Trucks

# "Iron the Roads for Fords"

*and smooth the way for Jobbers and Dealers who want a shock absorber that sells*



## OUR GUARANTEE CANNOT BE BEAT

If after 30 days your customer is dissatisfied with H & D Shock Absorbers, he may return them and have his money refunded. We will send you a new set and a check for \$3 to pay you for your trouble.

## H & D SHOCK ABSORBERS "Single or Twin Arm"

**H & D Company, Inc.**  
GOODLAND, IND.

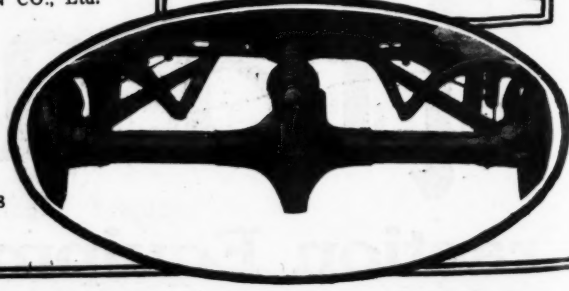
In Canada  
RICHARD-WILCOX CANADIAN CO., Ltd.  
London, Ont.

Letters Patent in Canada.

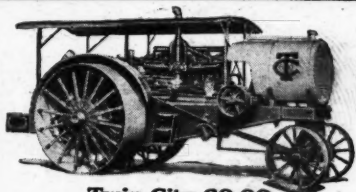
U. S. Patents  
May 8, 1918 April 23, 1918

## OUR JOBBERS SERVICE HAS NO EQUAL

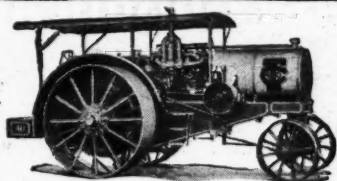
H & D service to jobbers has become nationally known. We are now in a position to serve our jobbers with full page electrotypes showing installation and parts of the H & D—all ready for insertion in your catalog forms. Write or wire us for it, stating exact size required.



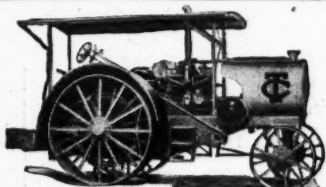
# Sell More Efficient Belt Power



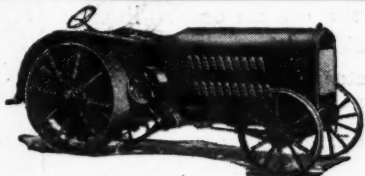
Twin City 80-90



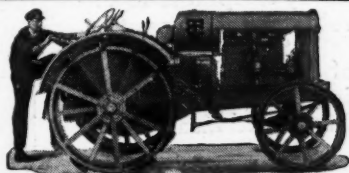
Twin City 40-65



Twin City 25-45



Twin City 16-30



Twin City 12-20

**T**HE belt power feature of the Twin City 12-20 is not an attachment or an afterthought. It is a carefully designed part of the tractor and gives the steady, elastic power so necessary for belt driven machinery.

Its sixteen-valve-in-the-head kerosene engine has many exclusive advantages for belt work.

It burns the cheap kerosene fuel perfectly—it delivers the power smoothly to the belt under varying loads—it has a bigger reserve power for the peak load—and it is perfectly controlled by the governor.

Now is the time to go after the belt power business, and the Twin City 12-20 will get it because it is made to do the work, not to meet a price. In selling the Twin City you also have the advantage of Twin City automatic quantity discounts, a full Tractor-Thresher Line with power farming tools, live sales assistance and a big national advertising campaign.

## MINNEAPOLIS STEEL & MACHINERY CO., Minneapolis, U. S. A.

### BRANCHES AND DISTRIBUTORS

Minneapolis Steel & Machinery Co.—Denver, Colo.; Des Moines, Ia.; Peoria, Ill.; Fargo, N. D.; Great Falls, Mont.; Wichita, Kan.; Salt Lake City, Utah; Spokane, Wash.

Twin City Co.—Indianapolis, Ind.; Lincoln, Neb.; St. Louis, Mo.; Kansas City, Mo.; Crowley, La.; Dallas, Houston, Amarillo and San Antonio, Texas.

Southern Machinery Co.—Atlanta, Ga.

Frank O. Renstrom Co.—San Francisco, Oakland, Stockton, Los Angeles & Sacramento, Cal.

Baskerville & Dahl Co.—Watertown, S. D.

Eastern and Export Offices, Minneapolis Steel & Machinery Co.—54 Nassau St., New York City.

Minneapolis Steel & Machinery Co. of Canada, Ltd.—Winnipeg, Man.; Calgary, Alberta; Regina, Sask.

# TWIN CITY





# Power

- abundant  
- flexible  
- economical

Abundant power because the Jackson Pneumatic Drill has the most simple, compact air motor known. It is built on the same principle as the turbine propellers on an ocean liner. Designed especially for the garage and service station where a light weight, powerful tool is needed, it has been found indispensable for work in close quarters.

Flexible power because the motor has an infinite variation of drilling speeds—instantly adaptable to different materials and easily controlled by the operator.

Economical power because of its sturdy construction throughout and extreme simplicity which makes its operation safe in the hands of unskilled and careless workman.

Bearings, chuck, throttle, etc., are recognized as the highest grade obtainable. One size 0" to 1/2".

*Write our sales department immediately for detailed information and prices.*

**KALAMAZOO RAILWAY SUPPLY COMPANY**

Manufacturers of

**Jackson Electric Pneumatic Grinders & Drills**

Sales Department

**THE BAILEY-DRAKE CO., INC.**

1120 S. Michigan Ave., Chicago



# Safely Tucked in with Tungar!

Do you know that a fully charged battery never freezes? You can protect your radiator by draining it, but how about your battery?

The only cure for a frozen battery is a new one. A little watching and occasional doses of Tungar will prevent freezing—your battery will be **there** when you want it.

Tungar is the battery charger that makes every lamp socket a charging station.

*Ask us for booklet 3532 and name of nearest dealer.*

35A-17



**Tungar**  
RECTIFIER

**General**  **Electric**  
General Office **Company** Schenectady, N.Y.

# BERGOUGNAN TIRES

## We Are Engaged in the Business of Manufacturing and Selling Automobile Tires

We have been making tires for more than twenty years and along with the experience gained in the art of making tires, we have acquired a little wisdom in the science of selling them.

We know that a lasting success can only be built up through re-sales, and we also know that re-sales come not from the persuasiveness of words or the abundance of superlatives in the mouth of a salesman or in the body of an advertisement, but solely and exclusively from the performance of the tires themselves.

We guarantee the performance of our tires—6,000 miles for fabric and 8,000 miles for cord—not only by the quality of the material, and the experience and skill of the labor employed, but BY A BOND FILED BY US WITH THE NATIONAL SURETY CO.

Each Bergougnan Tire has attached to it a certificate signed by the President of the National Surety Co. which guarantees the purchaser against any possible failure on the part of the manufacturer to live up to his mileage guaranty.

Armed with this double guaranty you can sell Bergougnan tires with ease and a clear conscience. It answers every question and disposes of every objection the tire user can raise.

IT MEANS SELLING—AND BUYING—MILES—NOT RUBBER.

## BERGOUGNAN RUBBER CORP.

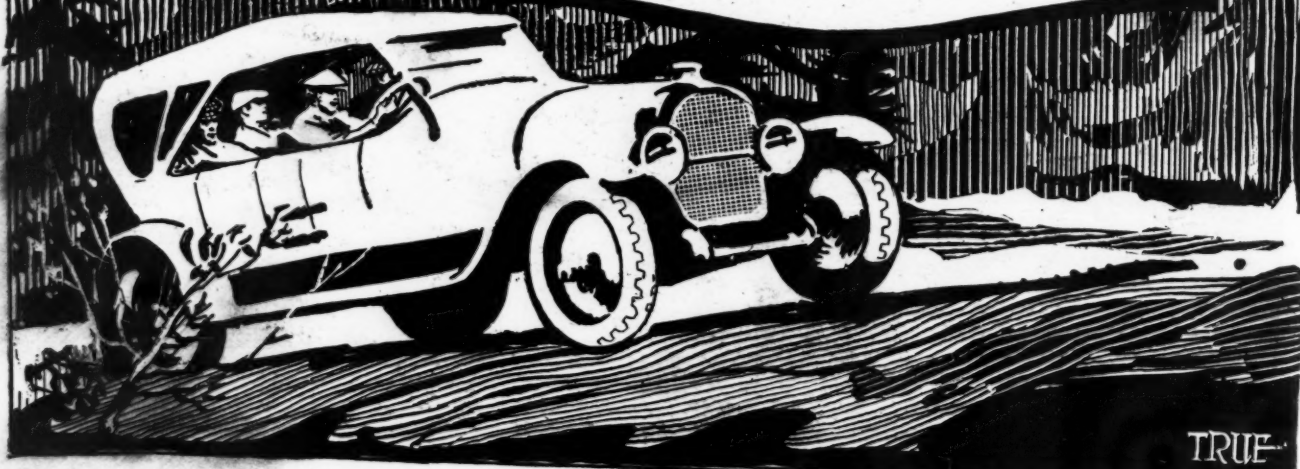
TRENTON, N. J.

### FACTORIES:

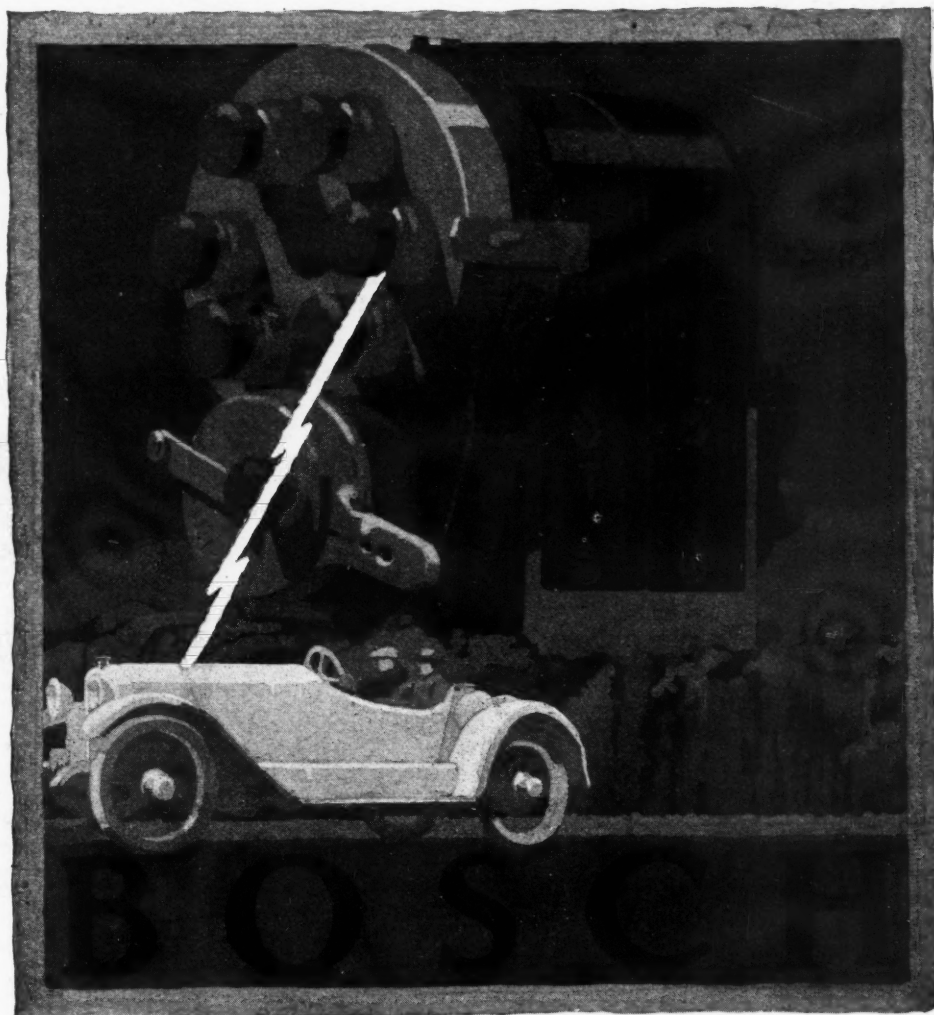
Clermont-Ferrand, FRANCE  
Trenton, U. S. A.  
Moscow, RUSSIA  
Turin, ITALY

### BRANCHES:

New York  
Philadelphia  
Montreal  
Toronto



TRUE



## THE SALES CLINCHER

Is the ignition system on the automobile you sell a sales asset? Does it help you to close a sale?

Bosch High Tension Magneto Ignition adds the sales weight of Bosch Prestige—Bosch Advertising—and of the nation-wide, world-wide chain of Bosch Service Stations to your own sales efforts.

Bosch Equipt is a definite, tangible sales clincher. And your automobiles can come through from the factory Bosch Equipt if you insist on it.

*Be Satisfied—Specify Bosch*

### AMERICAN BOSCH MAGNETO CORPORATION

Main Office and Works: Springfield, Mass.

Branches: New York, Chicago, Detroit, San Francisco.

300 Service Stations in 300 Centers

### AMERICA'S SUPREME IGNITION SYSTEM

MOTOR TRUCKS, TRACTORS, AIRPLANES, MOTOR CARS, MOTOR BOATS, MOTORCYCLES, GAS ENGINES



## Dealers:

Your Customers  
Would Have to  
Pay A Much  
Fancier Price  
For Any Other  
Tire of This  
Quality. :- :-

---

Henderson is out to pioneer its way  
to big business on a *fair price* basis.  
A franchise of exceptional value.

---

There has not yet been devised a better way to build tires than the Henderson method. This sturdy, resilient, long lived, slow wearing casing is a leader among leaders—and was designed and built for no other purpose than to deliver a product of rare quality. In this, we were one with the other high grade producers.

But not in the matter of price. The tremendous demand for tires has put a strong weapon into the manufacturers' hands—and in most cases the temptation proved too strong. Excessive prices became the rule. Do you know what it costs to make a good tire?

We have adopted the other course. Henderson Tires have been priced on a basis of cost-to-produce and cost-to-sell, plus an adequate return on capital and labor invested—not on a basis of "all that the market will stand."

We want dealers who believe in this policy. To such men we offer a valuable franchise. There is a great future for a fine tire that is honestly priced, and the right dealers who get behind this movement with a real effort have an opportunity to build up a veritable monopoly.

IT WILL PAY BIG. Name your territory, and we'll talk business.

### HENDERSON TIRE & RUBBER CO.

General Sales Office

40 EXCHANGE PLACE, NEW YORK

FACTORIES: Bucyrus, Ohio; Columbus, Ohio

# HENDERSON TIRES

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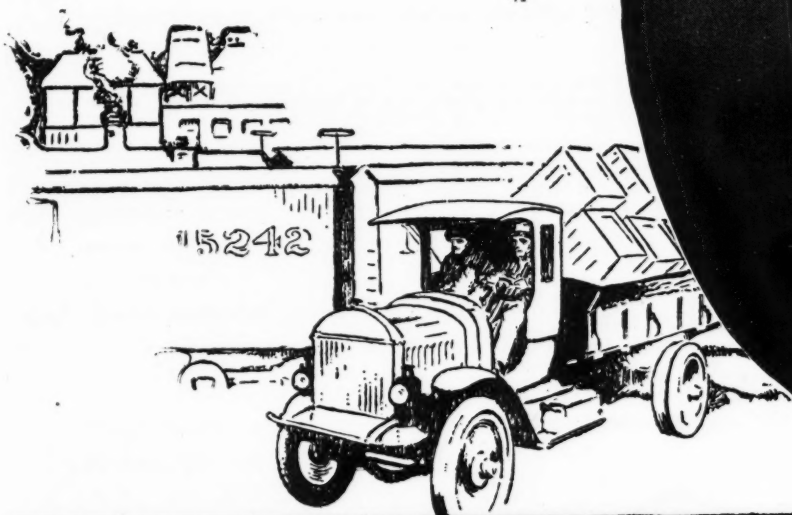
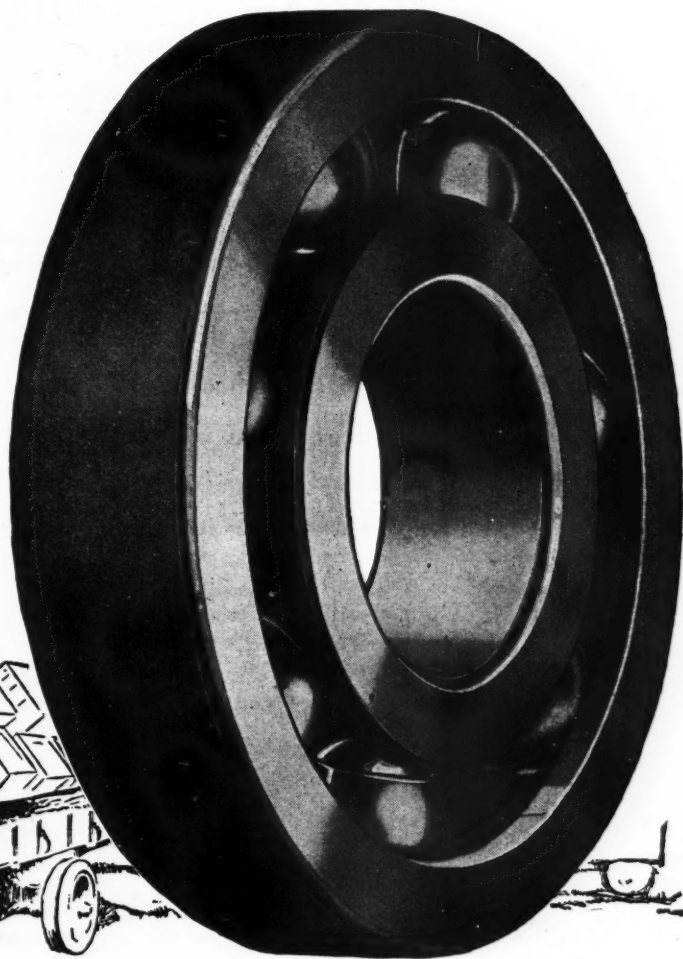
# Strom BEARINGS

Those who have had most experience with bearing equipment are quickest to appreciate the unusually high quality of Strom Bearings. By dependable performance in many lines of industry they have proved their worth. The nation-wide demands for these bearings has steadily increased from the first.

## U. S. Ball Bearing Mfg. Co.

(Conrad Patent Licensee)

Palmer Street and Kolmar Avenue, Chicago, Illinois



# Free to All Who Buy Motor Age on the News-Stands

WE WANT TO KNOW:

*WHO YOU ARE  
JUST WHY YOU LIKE MOTOR AGE  
WHAT OUR EDITORS CAN DO TO MAKE  
YOU LIKE IT BETTER.*

This is not an attempt to get subscriptions in any sense of the word—we have already received (and classified) this information from our regular subscribers.

If you will fill out the attached blank and mail it to us, we will send you gratis an eight page pamphlet containing:

Engine trouble chart, showing how to locate trouble in a motor of a car.

Lubrication chart, showing where and when to oil a car in constant use.

Valve Timing chart, giving average valve timing for all engines.

Engine and Car Speed chart, showing how to find car speed in miles per hour.

Piston displacement charts for four and six cylinder engines.

You will find this well worth the co-operation we ask for—an exchange that will be mutually beneficial.

Please fill out the blank, detach and mail to MOTOR AGE, Mellers Building, Chicago, and receive your copy of these charts by return mail.

MOTOR AGE

Mellers Bldg., Chicago, Ill.

1. Question: Which departments of MOTOR AGE interests you most?

Answer: .....

2. Question: Are you directly or indirectly connected with the automotive trade or industry?

Answer: .....

3. Question: Do you sell cars, trucks, tractors, accessories or parts on a limited or large scale?

Answer: .....

4. Question: If you are not connected with the automotive trade or industry, what is your line of business?

Answer: .....

5. Question: Why do you find it more convenient to buy your copies from the news-stand than to become a regular subscriber?

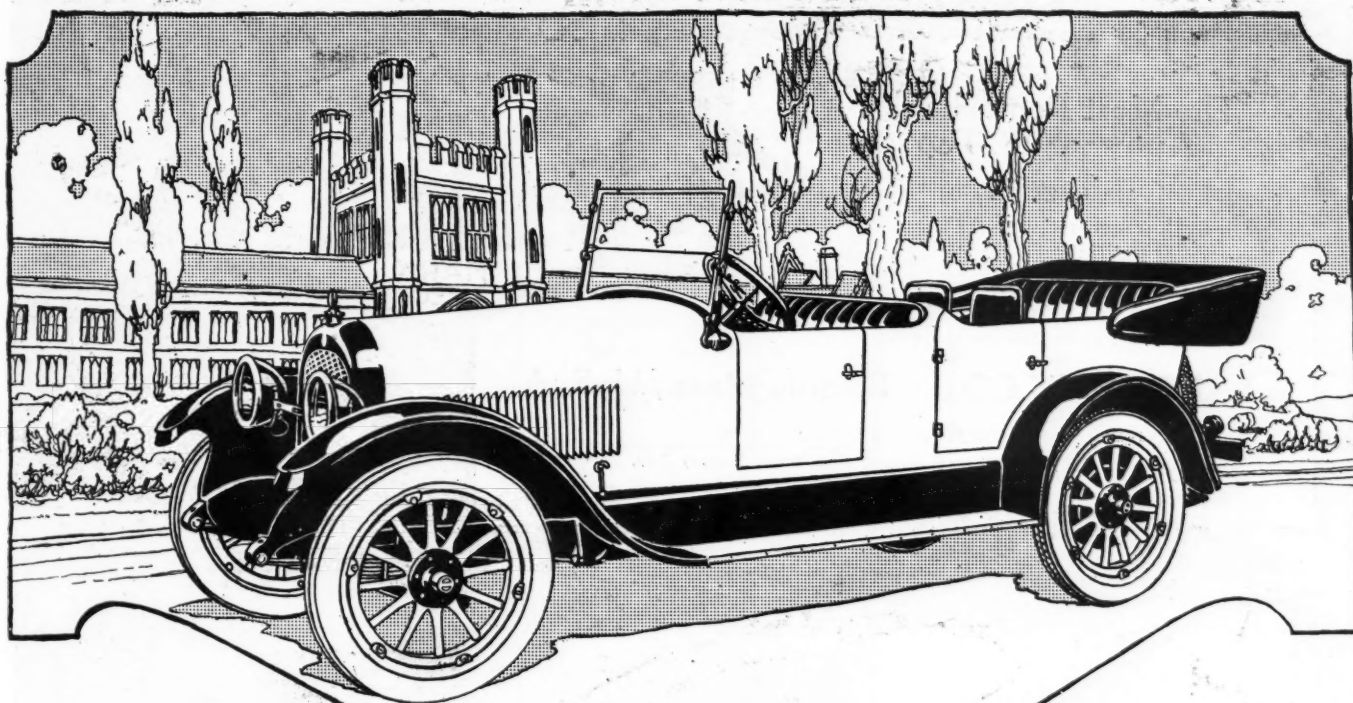
Answer: .....

6. Question: Have you answered all the above questions?

Answer: .....

Please mail my pamphlet of charts to:

Name ..... Address .....



# STEPHENS

## *Salient Six*

### Four Cardinal Qualities Make Its Greater Value—Its Greater Service

Beauty with comfort—safety with reliability.

These cardinal qualities round out a greater value and a greater service to fullness in the Stephens Salient Six.

Singly and collectively, they contribute to the height of motor car satisfaction.

In the Stephens Salient Six you can possess and enjoy beauty and comfort; in slim, narrow hand-built bodies that are of new American style—in deep soft leather upholstery, French pleated and stuffed to fullness—colors that are warm and rare—a finish that is lacquer-like and lasting.

The Stephens Salient Six depends largely upon its powerful and economical perfected overhead-valve engine for its safe and reliable service. The Stephens engine is rated at 25.3 H.P., yet develops 57.

Its vast reserve power is an added factor of safety and reliability.

A beautiful, comfortable, safe and reliable motor car—certainly a car of greater value and greater service.

These features also have helped make the Stephens selling franchise one of greater value.

**STEPHENS MOTOR WORKS**  
*of Moline Plow Co.*

Sales Office:  
Moline, Ill.

Factories:  
Freeport, Ill.

A GREATER VALUE



A GREATER SERVICE

**The Most Remarkable  
Automobile Top  
Material**

LIGHT IN WEIGHT  
DEPENDABLE IN QUALITY  
NON-CRACKING—NON-BLISTERING

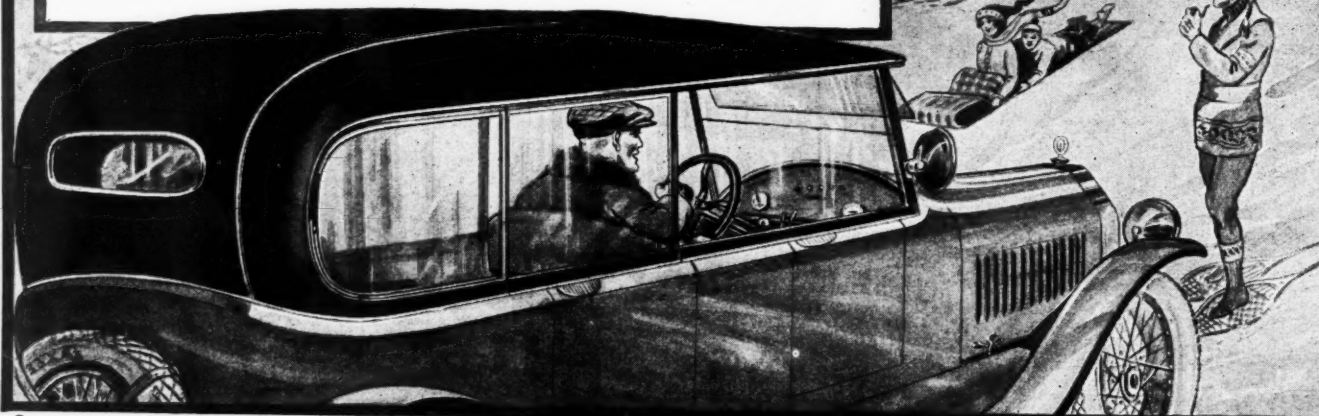
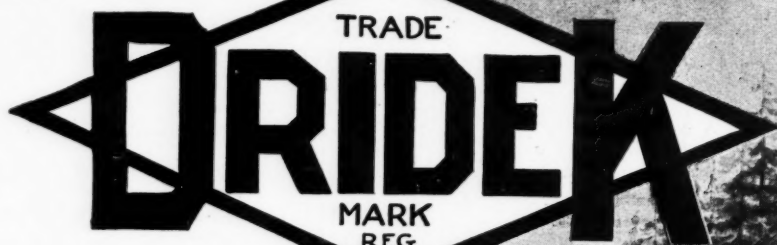
Dridek Is Made to Satisfy

Send to Dept. C for Samples and Prices

**L. J. MUTTY CO., Boston, Mass., U. S. A.**

NATIONAL AUTOMOBILE SHOW

Space D-115, Grand Central Palace, New York, January 3-10, 1920

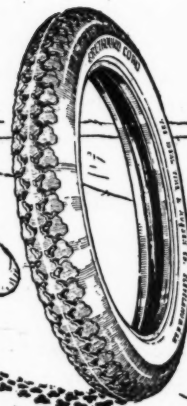


# GREYHOUND TIRES AND TUBES

THE IDEAL TIRE & RUBBER CO.  
GENERAL OFFICES & FACTORY  
CLEVELAND

Territory open  
for live dealers

*On the trail of a Good Tire*





**GARAGE SERVICE**

**CLOSED**

**CLOSED FOR THE WINTER**

**DON'T**  
let winter  
weather  
close your  
shop  
or cut  
your profits

**GARAGE**

**CYLINDER  
REBORING  
MOTOR  
REBUILDING**

**Keep the shop busy and make big money with**

# STORM

## REBORING MACHINES



Reborining  
Fordson  
Cylinders  
with  
Storm  
Standard  
Reborining  
Machine

**R**IGHT now is the time for every garage man to cash in big on motor rebuilding.

Put a Storm Reborining Machine in your shop now. Do the Cylinder reborining, the most important and the most profitable part of the work, yourself, and make these extra profits.

Storm Reborining Machines are standardized. Made in various capacities to meet your individual requirements. Built for hand or power operation.

### STORM MOTOR REPAIR EQUIPMENT

Cylinder Reborining Machines  
Valve Port Renewing Tools  
Connecting Rod Gauges  
Bearing Tools

Piston Vises  
Main Bearing Babbiting and  
Boring Tools

Storm Tools offer you the best investment you could make to bring *more jobs* into your shop. They will keep your shop busy all the time.

Write us today for full information.

**STORM MFG. CO.**

DEPT. A

Minneapolis, Minnesota

# Some Piston! Ford Cars

*Latest Improvement For*

COMPLETE WITH RINGS AND PIN



*A Cochran Product*

## INCREASES MILEAGE 25%

*Light Weight Step-Cut Rings Oil Groove*

Furnished in Standard Size. Also the following Oversize:

.0025 .005 .010 .015 .020 .025 .03125 .045

ORDER TODAY

TRIAL ORDER

## Detroit Metal Products Co.

Phones: Main 798, Main 799

Detroit, Michigan

Garages and Repair Shops  
DETROIT METAL PRODUCTS CO.,  
Detroit, Mich.  
Please ship by Parcel Post prepaid, 1 complete set of COCHRAN PISTONS  
Size ..... Price \$7.20  
Name .....  
Address .....



"Over 1,500,000 in use. Nearly every jobber and dealer in the United States stock Rose Tire Pumps and a full line of Repair parts for them."

"That looks good to me. I'll just take it along. How much money?"

"Yes, that's the trouble, but the Rose Tire Pump does not have a brass barrel and will not jam or dent in the tool box."

"Is the Base Cast Iron?"

"It is not. The base is machined from solid screw stock and the stirrup folds alongside the barrel."

"Will the barrel rust?"

"Most assuredly not. The barrel is enameled and baked, it—"

"How about that hose?"

"That hose, my dear sir, is the best I ever saw on any pump, 17-32 outside measurement and 3-16 inside with an inner wall of pure para rubber and 5-ply extra tested fabric."

"Many Rose Tire Pumps sold?"

"Only \$3.00 and you have a pump that will give you satisfactory service for five years. By the way, how much service did you get out of the pump you got with your car?"

"Eh? Service did you say? You can guess. I must go, the folks are waiting. Good-bye."

*Manufactured and Guaranteed by*

## J. H. HANEY & CO.

## Hastings, Nebr.



# ZIP

A REAL  
TUBE PATCH

*Sticks every where  
except on your shelf.*

Sells readily because every motorist appreciates this simple, effective, cold tube patch which requires neither cement nor heat. Road heat completes the vulcanization process.

If you are not carrying "ZIP" write for complete information and prices. It's a real tube patch. Sold under a "Money Back" guarantee.

**BAKER & LOCKWOOD MFG. CO.**

Established 1870

KANSAS CITY, MO.

BROOKLYN, N.Y.  
473 Kent Ave.

CHICAGO, ILL.  
3021 Michigan Ave.



# HALLADAY

**Direct Suspension Shock Absorber**



**Travel the Rough, Ice-Encrusted Roads  
in Perfect Comfort**

The most weather scarred, pitted and bumpy roads have no terrors for the Halladay equipped Ford Car. For the Halladay is the only Shock Absorber that ever had the CAPACITY to take the jolts and jars out of the light little Ford car.

Every vibration and the last vestige of rebound is absorbed before it can even reach the leaf spring.

This greatly lowers gasoline and tire bills to say nothing of the tremendous saving of wear and tear that is effected.

Price per set ..... \$15.00

**L. P. HALLADAY COMPANY**

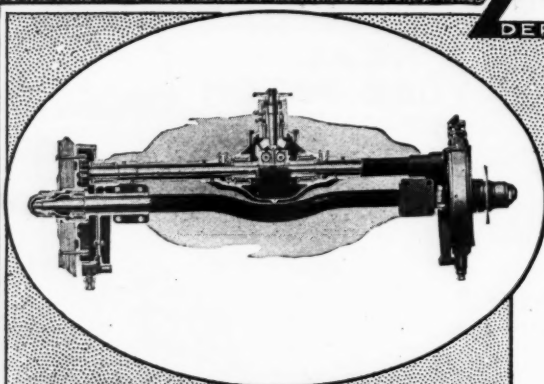
Manufacturers of Bumpers, Shock Absorbers and Automobile Accessories  
520-530 Monroe Street  
Streator, Illinois.

# TRI-ANGLE



*A Three-Fold Value*

$\frac{3}{4}$  ·  $1\frac{1}{2}$  · 2 Special &  $2\frac{1}{2}$  Ton Models



*Eastern Representatives*  
**TRIANGLE MOTOR SALES CO.**  
 381 Fourth Ave. New York City

*New England Distributors*  
**Eugene F. Lally and Sons Co.**  
 Boston, Mass.

## DEPENDABLE POWER

Triangle rear axles do not absorb most of their power—they **transmit** it.

On the whole, they supply to the wheels a greater percentage of actual driving impulse than in any other type of axle. This is particularly so at **slow speed**, where Triangle Trucks are **fifty percent** more efficient than other types of drive.

"The Powerlock" differential locks both driving wheels together—the wheel having the **greatest** traction receives the most power.

*Some choice territory is still open. Address or wire, Dept. X.*



**TRIANGLE MOTOR TRUCK COMPANY**  
 St. Johns, Michigan

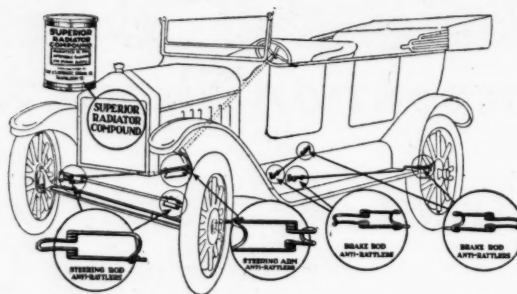


## SUPERIOR ANTI RATTLERS

For Ford, Dodge, Maxwell, Studebaker, and 95 Per Cent of All Other Cars

Makes your car  
 steer like new

Holds car straight



Prevent accidents

Eliminates wear,  
 vibration and rattle

Our Steering Rod Anti-Rattler made in four sizes: 75c per pair

No. 1, for Chevrolet 490, etc., No. 2, for Ford, Dodge, Maxwell, etc., No. 3, Small Mitchell, Willys Knight, No. 4, for Large Mitchell, Chandler, etc.

Our Steering Arm, Anti-Rattler (Ford Car only) eliminates vibration and road shock from the Steering Wheel and takes the rattle out of the Steering Gear Ball Arm. 50c each.

Our Brake Rod Anti-Rattlers (for Ford and other small cars) insures safety and silence of brake rod joints. Per set of four, 50c.

## JESSOP & THOMPSON

1221 So. Michigan Ave.

U. S. Automatic Spring Co., Manufacturers

Chicago, Ill.

Sales Department Napoleon, Ohio

# Be Prepared to Grind Crankshafts

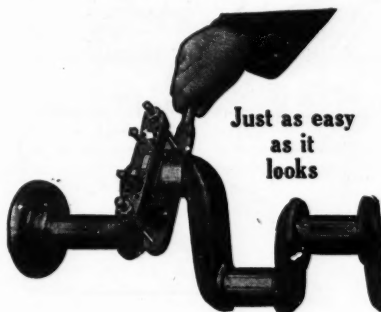
**First Job Pays for Tool—No Experience Required—No Equipment—No Expense**

**Y**OU pay a machine shop between \$10 and \$25 to grind a crankshaft. Make this profit yourself.

The Atlas Abrasive Tool (patented) will permit you to grind a crankshaft in one hour—without removing from crankcase—without experience—within one thousandths of an inch.

## Make Profits Yourself

If you have the Atlas Abrasive Tool, you can pick up many of the crankshaft grinding profits that are going to machine shops. You will take out many motor knocks that are now ignored. You will build up a valuable reputation for quick service and absolute ac-



Pat. Nov. 11, 1919

curacy and your work will be of higher quality than any you can possibly buy from a shop that does not use the Atlas.

You only need one Atlas Tool. It fits all crank pins and bearing up to 2½ inch diameter. Its cutters are renewable and cost only 30c—good for from 10 to 20 pins or bearings. The tool is small

enough to operate easily inside a crankcase. In fact, on most jobs, you will merely drop bottom of crankcase and do the work from below. For use on pleasure cars and trucks. More than 2000 in use.

One job will more than pay for this ingenious tool. Sent postpaid with detailed instructions, for \$10. Extra cutters, including track bearing, 30c each. You need it. **WIRE YOUR ORDER TODAY, or use this coupon.**

**Atlas Manufacturing Co.**  
720 Canal Street, Pittsburgh, Pa.  
**USE THIS COUPON**

**ATLAS MFG. CO.,**  
720 Canal St., Pittsburgh, Pa.

Please send me one Atlas Abrasive Tool and ..... extra cutters, also complete instructions for its use.

Name .....

Address .....

City..... State.....



PRICE COMPLETE  
with 10 Feet of Cord  
and Plug

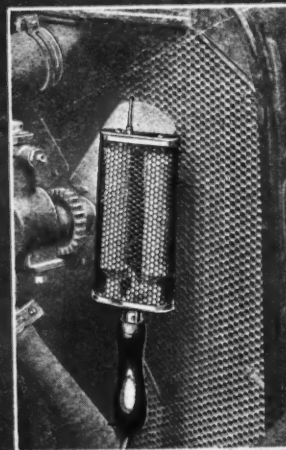
\$4.50, U. S. A.: \$6.50, Canada

## Keeps the Motor Warm All Night

Hangs in any convenient place under the hood and gives out a flood of warmth all night long. In the morning the motor is warm for a quick, easy start. Attached instantly to the nearest electric light socket. Keeps the engine, carburetor, manifold and radiator warm. No danger of fire as where flame heat is used. Delivers the heat where it is needed—under the hood. Saves coal—cheaper to use than a garage heater.

*This is just what car owners want.  
Write for complete information.*

**Any Jobber Can Supply You**



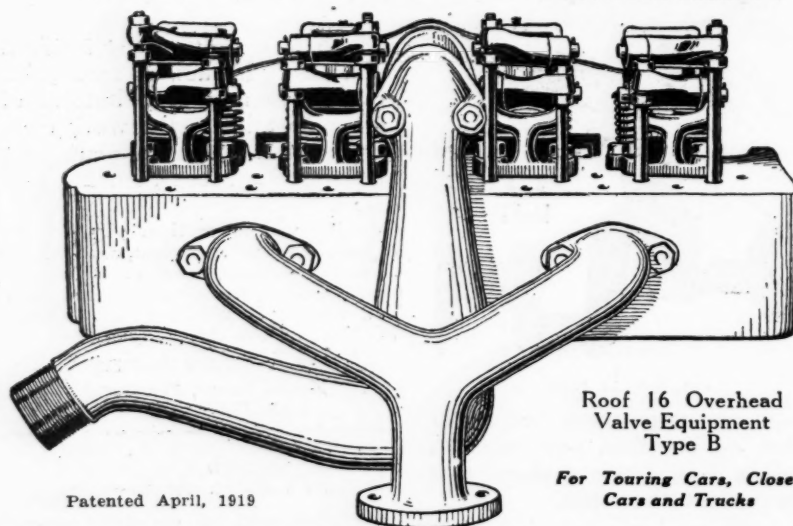
**METAL SPECIALTIES MFG. COMPANY**

338-52 N. Kedzie Ave., Chicago  
Eastern Branch, 16-24 W. 61st St., N. Y.

# POWER and SPEED

## Roof 16 Overhead Valve Equipment

For Ford Motors



Patented April, 1919

Roof 16 Overhead  
Valve Equipment  
Type B

For Touring Cars, Closed  
Cars and Trucks

Comparison Brake Horse Power Tests at the United States Bureau of Standards gave Standard Ford motor with regulation carburetor 18.7 Horse Power. The same motor with 16 Valve Head and regulation carburetor 22.4 Horse Power. The same motor with 16 Valve Head and Special carburetor 29.7 Horse Power. Recent tests at U. S. Bureau of Standards gave 32 Horse Power. We are Manufacturers and Distributors of speed and other specialties for Ford cars; 3 to 1 gears, high speed camshafts, aluminite, light grey iron pistons, lynite pistons, aluminite connecting-rods, racing

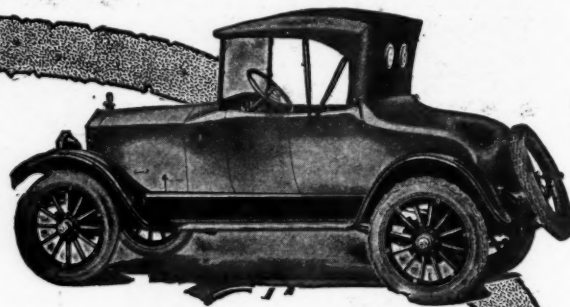
spark plugs, racing carburetors, roller bearings counterbalances, wire wheels, multiple speed transmission, high tension magnetos, special oiling system, special worm and gear, steering gear, racing tires, racing bodies, hood and radiator, parts for underslinging chassis. Tell us what you want. We can supply it. Racing quality. Lowest prices. Send for our Complete Literature on how to build fast cars and double the value of your converted Ford Truck and descriptive circular on Speed and other Specialties for Fords.

**LAUREL MOTORS CORPORATION**

**The Most Remarkable  
Power Device, Even  
in This Inventive Age**

Hill Climbing for touring cars—pulling power through sand and mud—doubles the hauling capacity of converted Ford truck-speed for mile and half-mile tracks to rival the fastest cars built. Ford racing cars with our Cylinder Head Equipment and special racing parts have attained speeds from 80 to 100 miles per hour. Price, complete, \$115.00 f. o. b. factory, excise tax paid. Nothing extra to buy. Cylinder Head Equipment all ready for installation. It takes the place of the regular Ford Cylinder Head. Any mechanic can easily and quickly install it.

**Anderson, Indiana, U. S. A.**



## A Safe Investment

Men and women of today buy their cars as they buy their bonds.

They want safety, permanence and reasonable returns on their investments.

The car that will make good for the dealer, therefore, is the car that will make good for the owner.

The Dixie Flyer is built to pay large dividends in service and pleasure. It is backed by a permanent company with more than forty years' experience in vehicle manufacturing—a company that will be as willing and able to protect the interests of dealers and owners in the future as it is today.

KENTUCKY WAGON MFG. CO., INCORPORATED, THIRD AND G STREETS, LOUISVILLE, KENTUCKY

*The* **DIXIE** *Flyer*

*The* **DIXIE** *Flyer*

# Ford and Fordson Dealers

## Replace Main Bearings Quickly—Accurately—Yourself

*You can replace the main bearings in a Ford Model "T" or Fordson Tractor Motor yourself—in your own shop—quickly, accurately and at a profit*

### Use the Universal Main Bearing Replacement Equipment

Universal Main Bearing Replacement Equipment will allow you to replace the main bearings in a Ford or Fordson in 20 minutes.

Easy to operate—full instructions, even to the proper babbitt metal, given with each equipment.

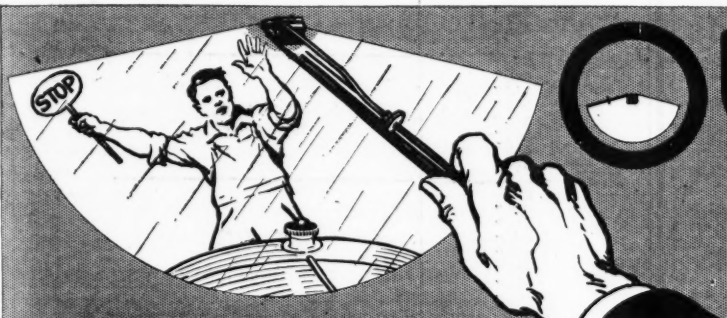
Accuracy of work is assured by the perfect alignment of the tool—secured by a bar passed through the camshaft holes giving the same true alignment of bearings as when the motor was first made by the manufacturer.

See current issue of Automobile Trade Directory and Chilton's Directory for list of jobbers carrying stock.

**The Universal Tool Company, Inc.**

435 Woodward Avenue Detroit, Mich.

Manufacturers of Universal Cylinder Boring Tools and Main Bearing Replacement Equipment for Fords and Fordsons



# OUTLOOK

## WINDSHIELD CLEANER

### \$ 2.00

## Sell the Best Known Cleaner!

Outlook is not only the best cleaner but the best-known cleaner. It has been in use so long as to have a thoroughly established trade among satisfied users. Now extensive advertising is making it still better known. Dealers are concentrating their efforts on Outlook because it fills a real need, because it has a demand established and because a satisfactory profit can be made by pushing it.

Get in touch with your jobber TODAY for prices. This is an all season seller but there's no use missing business right now when sales are easiest of all!

**THE OUTLOOK COMPANY**

5529 Euclid Avenue, Cleveland

### Ought to be Legal Requirement

Many dealers say "The law should compel the use of windshield cleaners." It's coming some day! In the meantime certain far-sighted dealers will be *skimming the cream off the trade*. Why not be one of them? Now is the time to make your profits!

### Feature the Outlook

Put the Outlook Cleaner in stock. Call it to your customers' attention. Feature it in the window every stormy day. Put the same effort behind it that you would put behind any active line, and you'll find it turning your capital at a mighty pleasing rate! Have you an Outlook on your own car?

## Short Circuits Impossible with ZIG-ZAG Wichita Spark Plug

Exclusive  
Rights  
for  
Dealers



**Will Spark  
Through Oil or  
Carbon**

Ordinary Spark Plugs miss fire when they are fouled by oil or carbon. As soon as the current finds an easier route over the carbon surface which forms on the porcelain, it makes a short circuit.

An exclusive feature in the Zig Zag Spark Plug prevents this and forces the current through its proper course. The result is a sure spark—always.

Dealers: If you want exclusive rights in your territory on a spark plug that motorists have been looking for and one that will net you exceptional profits—wire or write at once.

**Wichita Zig Zag Spark Plug Co.  
WICHITA KANSAS**

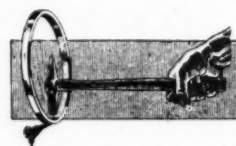
## American *Hammered* Piston Rings

### List Prices

DIAMETER	WIDTH		
	3/16"	1/4"	5/16"
Also 5, 10, 20, 30 and 60 thousandths oversize in diameter	Also widths of 5/32", 7/32", 9/32" and 3/8" when specified		
2 1/4" 2 5/8" 2 3/4" 2 13/16" 2 7/8" 3" 3 1/4" 3 1/2" 3 3/4" 3 1/2" 3 5/8" 3 11/16" 3 3/4" 3 3/8" X 3 7/8"	\$1.00		
4" 4 1/4" 4 1/2" 4 3/4" 4 1/2" 4 5/8" 4 3/4" 4 7/8"	\$1.25		
5" 5 1/4" 5 1/2" 5 3/4" 5 1/2" 5 5/8" 5 3/4" 5 7/8"	\$1.50		
6" 6 1/4" 6 1/2" 6 3/4" 6 1/2" 6 5/8" 6 3/4" 6 7/8"	\$2.25		
7" 7 1/4" 7 1/2" 7 3/4" 8"	\$2.75		

1/4" (Special wall thickness .136"—.150") FORD

No extra charge for oversize rings



ONE PIECE LEAKLESS GUARANTEED

**AMERICAN HAMMERED  
PISTON RING CO.**

BALTIMORE, MD.



*Steadily higher and stronger rises  
the fame of Prest-O-Lite, the*

### Fastest Growing Battery Business in the World

**W**ITHIN two years twenty leading manufacturers have equipped their cars at the factory with Prest-O-Lite.

Grilling tests proved its superiority for starting and brilliant lights, and hundreds of thousands of motorists now demand Prest-O-Lite, the battery they don't have to bother about. Over 1000 Service Stations keep this best battery at its best.

That's why it's so easy to sell and the pot is kept a-boiling through intensive local newspaper campaigns and national advertising in leading periodicals.

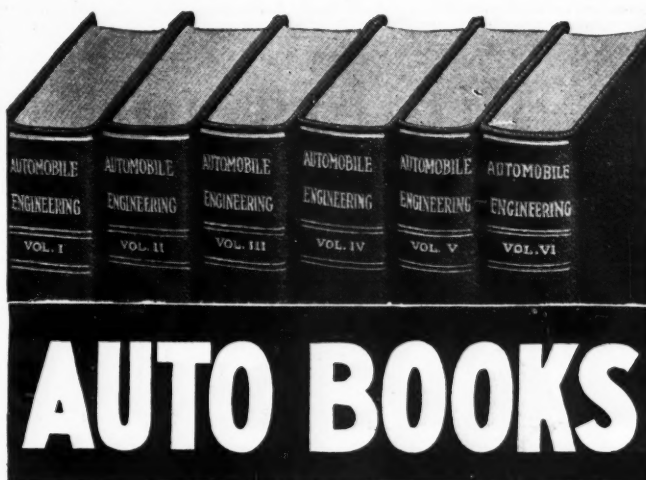
The amazing growth of Prest-O-Lite offers opportunities for some more profitable service stations if you can meet the qualifications essential to the high standards of the great Prest-O-Lite organization.

*Write for information with regard  
to possible location in  
your territory*

**THE PREST-O-LITE COMPANY, Inc.**  
30 East 42nd Street, New York, N. Y.

Prest-O-Lite Company of Canada, Limited, Toronto

512



## AUTO BOOKS

### New Edition

**7<sup>C</sup>**  
A Day

Now ready for you—this marvelous six-volume Library on Automobile Engineering! The newly written reference work covering the construction, care and repair of pleasure cars, motor trucks and motorcycles. The most complete and advanced information in Ignition, Starting and Lighting Systems, Garage Design and Equipment, Welding and other Repair Methods. Six

word volumes beautifully bound in flexible covers, gold stamped. 2600 pages (5½ x 8½ in.), 2100 illustrations, tables and explanatory diagrams. This great automobile library, combining the knowledge of the greatest experts in the business, now yours on payments so small as to average only 50c a week, or only 7c a day.

### SHIPPED FREE

No money in advance. Not a cent. See the books in your own home or shop absolutely free, at our risk. Read them, examine them, study them for seven whole days before you need decide whether you want to keep them or not. Send no money to get the books for free examination. Make no deposit. Assume no obligation. Simply put your name and address on the coupon below and mail it to us. The books will be promptly shipped to you for your examination. Take seven days to ascertain their value to you. If you are not more than delighted with them and do not consider the books one of the biggest bargains you ever made, just send them back to us and you won't owe us a penny. If you value the books and see them to be worth many times their price to you, send only \$2 in seven days, and then \$2 a month until the special introductory price of \$19.80 has been paid.

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### Send No Money

Every repair man, every auto mechanic, every auto driver and owner will prize this magnificent library. Even the most experienced veteran in the business will find a wealth of practical information and help in this work. Prove their value to yourself at our risk. See the books without cost or obligation to you. Not a cent do you risk by sending the coupon. So do it today—NOW—while this special offer is open. You have nothing to lose and much to gain.

### AMERICAN TECHNICAL SOCIETY

Dept. A-419A, CHICAGO, ILLINOIS.

**FREE  
CONSULTING SERVICE**  
With each set we give you free, a year's Consulting Membership in the American Technical Society. The regular price is \$12. Put your problems up to our Staff of Experts, for one entire year.

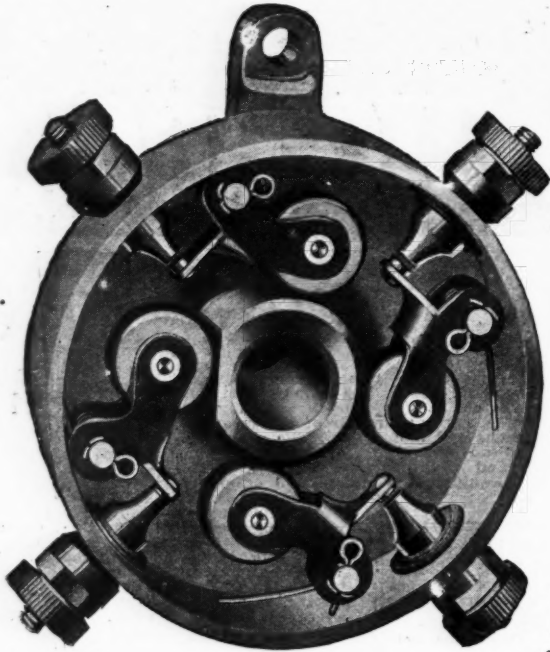
American Technical Society,  
Dept. A-419A, Chicago, Illinois.

Please send me the 6-volume Automobile Engineering for 7 days' examination, shipping charges collect. If I decide to buy, I will send \$2 within 7 days and the balance at \$2 a month until the \$19.80 has been paid. Then you send me a receipt showing that the \$30.00 set of books and the \$12 Consulting Membership are mine and fully paid for. If I think I can get along without the books after the seven days' trial I will return them at your expense.

Name .....

Address ..... Reference .....

## Timers and Mathematics



### Here's a Little Problem

Ordinary timers for Ford cars usually last about 3000 or 5000 miles. That ten or fifteen timer replacements during the life of the car. The problem is—how can these costly replacements be eliminated?

### Here's the Answer—

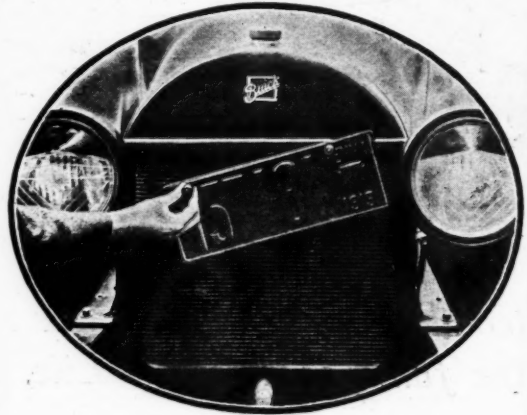
The Duntley is absolutely guaranteed for 50,000 miles—the life of the car.

The Duntley is friction proof and requires no lubrication. There are no sliding contacts to jump and skip over a metal segment. The positive make and break contact overcomes all starting troubles.

That is why the Duntley Magneto Break Timer is the most economical and efficient Timer for Ford Cars. They are interchangeable with regular Ford fittings without alterations.

**J. W. DUNTLEY**  
1004 S. Michigan Ave. Chicago, Ill.

## THE LAMBERT License Plate Holder



### January 1st

is license changing time, when license plate holders will be in great demand by every car owner.

Mr. Dealer—Now is the time for you to prepare for your share of this business.

There's no better license plate holder on the market than the Lambert License Plate Holder—Made of the very best grade of steel—the one piece—finished in nickel or black, as you prefer—can be used on all cars.

Attractively displayed—50 on a card—  
—Will sell themselves by simply placing the card on your counter.

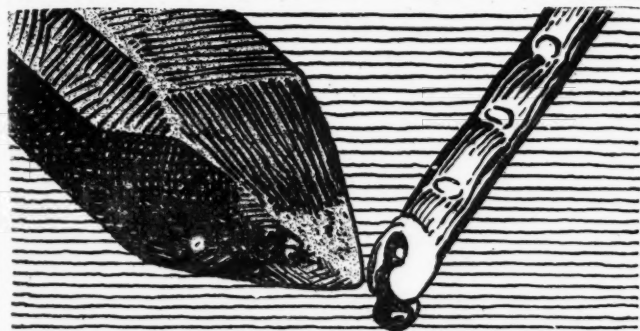
The most profitable license plate holder for the dealer—the most satisfactory holder for the owner.



Exact  
Size of  
Lambert  
Holder

Retail price \$1.00 for set of four  
Send for dealer's proposition and a trial set today—then stock up and be prepared for the first of the year's business.

**Lambert Manufacturing Co.**  
Highland Bldg.  
Pittsburgh · Penna.



## Speed Up Your Soldering Jobs

Don't waste time on your auto repair work by using a pot of acid, paste or some other fluxing agent. You can now solder without this bother by using

# Kester Acid-Core Wire Solder

It has a core made up of little cells full of flux. As you melt the solder off, flux flows out in just the right quantity to automatically take care of the fluxing.

### Handier and Easier to Use.

It is handier because you haven't the bother of preparing or carrying any separate flux. It is easier because just enough flux automatically flows out to make the solder stick. Any one, repairman or auto owner, can now do a first class job, and do it quickly.

### Get a Supply for Your Next Job.

*It is sold in coils in one pound cartons and on one, five and ten pound spools.*

Ask your supply house for it or mail in the coupon for free sample.

## CHICAGO SOLDER COMPANY

Manufacturer

218 No. Union Ave., Chicago

Pacific Coast Distributors: Sierra Electric Co., San Francisco, Cal.

### FREE SAMPLE COUPON

CHICAGO SOLDER CO., M.A. 12-11-19

218 No. Union Ave., Chicago.

Gentlemen: Please send me a free sample of your KESTER ACID-CORE WIRE SOLDER.

Name .....

Address .....

City .....

State .....

Our Supply House is .....



## Star Glass Wings

Will stop that draught on the back of the neck. They not only add comfort but instantly catch the admiring eye of the public. They deflect the wind and dust in summer and obviate the necessity of curtains in winter. They have no holes in the glass to weaken it, and cannot rattle as the glass is thoroughly protected with rubber bushings. Can be instantly shifted to any angle. Easily attached to any car.

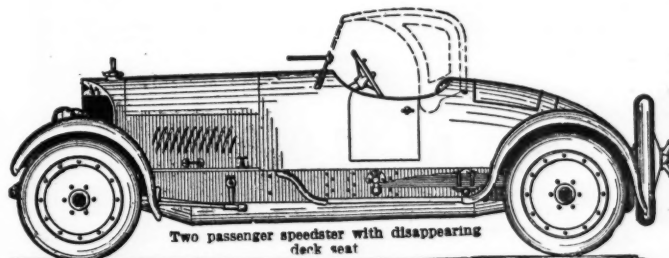
Price \$20.00 Per Pair

*Write for dealer's price. We will be pleased to furnish electros for your catalog.*

## Star Wing Company

170 WEST RANDOLPH STREET

CHICAGO



Two passenger speedster with disappearing clock seat



# Singer



Unexcelled in superb finish and skilled workmanship.

A motor car distinguished from all others in design throughout. A pleasure vehicle for those who discriminate and demand distinctiveness.

We specialize in individual design.

Open models \$5,800.00; closed models \$7,400.00 and up.

Agency inquiries given prompt consideration

SINGER MOTOR CO. INC.,

North Third Ave.

Mount Vernon, N. Y.

# Save

## TIRES LIKE THESE



**I Earned  
\$2200  
In Four  
Months**

This is Richard A. Oldham. Mr. Oldham was telegraph operator for the Illinois Central Railroad for twenty years. He is fifty-eight years old. One day he read one of my advertisements and the possibilities of making money in the Auto Tire Surgery Business. In a few weeks he had purchased and installed a Haywood outfit. A short time afterward he wrote us that his income in four months was as much as it had been in 2½ years as telegraph operator.

### Be a Tire Surgeon

**MAKE \$2,500 TO  
\$4,000 PER YEAR  
GIVING NEW LIFE  
TO OLD TIRES**

It is being done—by the wonderful new Haywood method of Tire Surgery. It is one of the great results of the war. A Haywood Tire Surgeon can do more with old tires than was even dreamed of before the war. By the Haywood Method a Haywood

Tire Surgeon can give 4,000 to 5,000 more miles of new life to a tire, that two years ago would have been thrown on the junk pile. As a surgeon saves human lives by his operations, so by Haywood Tire Surgery, you can save and lengthen the life of old tires. And it's easy to learn.

## HAYWOOD'S TIRE SURGERY

### Stations Are Needed Everywhere

20,000,000 tires wearing down every day. By Tire Surgery, you can quickly repair, rebuild and give new life to tires seemingly all worn out. Cuts, gashes, tears, bruises, broken fabrics, every kind of an accident that can happen to any tire, inside or out, you can repair and save for long service. The chance to make money is simply wonderful.

**\$2,500 to \$4,000 A YEAR is possible**

During the war the nation needed an unusual service to keep the thousands of automobiles, ambulances and aeroplanes going day and night. Haywood Tire Surgery met the demand.

If we told you all the truth you wouldn't believe it.

You would say, "It is too good to be true." But you can see what a great field there is for Haywood Tire Surgery Stations—for this better way. You have eyes. You see why there must be wonderful chances to make money. But to see—to know is not enough.

It is action—decision—that counts in these days. The man who waits, gets lost in the shuffle. It is the resolute will to follow your hunch that lands you where the money is.

**Send Today for My Free Book**

I have ready to mail you the day I get your request, a fascinating book—all about tires—how to repair them by the Haywood Method—how to start in business—how to build up trade—what to charge. You needn't write a letter—just tear out the coupon right now, fill it in and mail. In 48 to 72 hours you can have the whole proposition right in front of you. It's a case of walking right into \$2500 to \$4000 a year and up. Use coupon at the left.

M. HAYWOOD, Pres.

**Haywood  
Tire  
& Equip-  
ment Co.**

**WRITE TODAY**

M. HAYWOOD, President  
Haywood Tire & Equipment Co.  
500 Capitol Ave., Indianapolis, Ind.

DEAR SIR: Please send me by return mail your free book on the new Haywood Tire Surgery Method and the details of your free school of tire repairing.

Name .....  
Address .....

501 Capitol  
Avenue  
Indianapolis  
Ind.



# WAYNE

## TYPE "B"

### This Test Sells the WAYNE

Just telling your customers that Wayne Pumps are the easiest-acting—simplest—in fact, the best pumps on the market, may not impress them at first. But ask them to take a Wayne out to the car—put it on the tire, have them grasp the man's-size handle and pump. The ease with which the tire goes up—without the "back-aching" labor, will sell the Wayne then and there.

And the Wayne features keep it sold—safeguarding your reputation for quality merchandise—the steel tube handle welded to the piston rod cannot come off—the strong piston rod will never spring—the steel cylinder will not corrode nor easily dent—the cylinder is secured to the base by the shoulder seating method that absolutely prevents leakage at this vital point and its coupling is large enough to grip. The hose is heavy weight, guaranteed for one year.

The Wayne Pump pays you a handsome profit on every sale—so that you can afford to give this product some time and thought. Write your jobber for Wayne Pumps.

We will supply you with detailed information and our sales proposition—write for it to

### UTILITIES SALES CORPORATION

Suite 809 Stock Exchange  
Building  
Philadelphia, Pa.

Selling Agents for  
**WAYNE ENGINEERING CO.**  
Dept. "17-A"

Designing and Manufac-  
turing Engineers of Hones-  
dale, Pa.

After October 1st we will begin marketing a pump with the same features and capacity as the Type "B," but only 20 inches long over all—tool-box size—with a 1½ inch barrel.

WITH THIS  
HAYWOOD OUTFIT



# Install a Curtis Air Compressor



## The Curtis Sign

Illustrated above—is 10x14 inches—baked enamel on steel. Cannot be bought, but is furnished FREE with every CURTIS Garage Air Compressor—and cannot be had in any other way.

Display a CURTIS "FREE AIR" SIGN above your door—it inspires confidence and will help build your business. Motorists are looking for this familiar CURTIS slogan—because they know oil rots tires—and that a CURTIS Air Compressor furnishes AIR FREE FROM OIL, which means fewer blowouts, greater tire mileage and less repairs. The CURTIS is the ONLY Garage Air Compressor with the controlled splash oiling system that eliminates all danger of forcing oil into the air line.

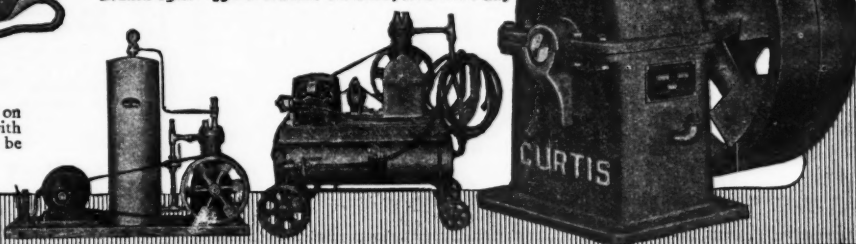
## CURTIS AIR FREE FROM OIL

Investigate the many exclusive features of CURTIS Garage Air Compressors. The line is complete—five sizes—stationary or portable. Just write your name and address on the margin of this advertisement—tear it out and send it to your jobber, or to us direct, for complete information and prices.

**Curtis Pneumatic Machinery Co.**

1527 Kienlen Ave., St. Louis, Mo.

Branch Office—530-H Hudson Terminal, New York City



# DETROIT

The Auto Center is the Logical Place To

## LEARN AUTO AND TRACTOR BUSINESS

There were 6,353 cars and 233 trucks licensed in July 1st, 1919. Thousands are being added to this astounding list every day until the number is now well over seven million. At the present rate it will reach the eight million mark before the end of the year, and still the demand is far ahead of production. And Detroit is the Heart of this tremendous industry.

**BIG FIELD—WONDERFUL FUTURE**  
Producers, distributors, garages and Service stations are rushed to the limit. This is the greatest, busiest year in the Auto Industry. Everywhere there is a demand for men—trained men who thoroughly understand the operation, care and repair of autos, trucks and tractors.

**EARN \$100.00 TO \$400.00 MONTHLY**

Our Course successfully teaches the Auto and Tractor business. It qualifies you to fill any position—successfully handle any job. Most complete, practical and up-to-date Course known. Every phase of work covered. Actual experience given on dozens of different cars. Our entire equipment is best obtainable. Brazing, Welding and Tire Repairing taught in separate Courses. Our graduates given preference everywhere.

**Unlimited Opportunities—Start Business of Your Own.**  
Hundreds of our students go right from Our School into business of their own—many of them who had never before thought such a thing possible. And these students are successful. They write us of having incomes way beyond their expectations, all because of the training received from the M. S. A. S.

**Big factories Endorse Our School.** The thoroughness of our methods and the completeness of our equipment are well known in the Auto Industry. The biggest factories in the Country heartily endorse our Course. In fact, many of the leading Auto Manufacturers assisted in outlining our Course and they give Our Students the fullest co-operation possible. These factories are constantly calling on us for graduates because they know the type of men we turn out.

**Start Any Time.** School open all year. No need to waste time. Instruction can begin same day you arrive. Three classes daily. Students aided in getting jobs to help pay expenses when necessary.

**Write For Free Catalog.** It tells the complete story of our School and several Courses. Gives names and quotes dozens of letters from our thousands of graduates. Contains 175 pages of valuable facts. Write today, or better still, jump train and come, as hundreds have done.

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**The Perfect One-Piece Piston Ring**

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## OLD SOL SPOTLIGHTS



"OLD SOL"

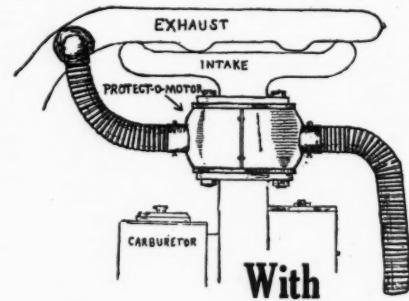
No. 76 Liberty Searchlight. Price \$5.50

Combined Push Button switch and focusing control in handle. Wing nut on bracket for inspection lamp. Double clamp bracket. Duplex wire to battery.

Three-inch mirror integral with lamp body, extra large silver plated reflector. Special high candle power bulb. Black enamel finish only.

Diameter of lamp front, 7 in. Weight, packed in 9½x6¼x6¼ carton, 4 lbs.

Made and Distributed by  
**THE HAWTHORNE COMPANY**  
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Boost  
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Winter  
Profits

With

## The Losee Protect-O-Motor "HOT SPOT"

Now comes cold weather—winter—the time when car owners know their carburetors can't vaporize the gasoline as quickly as in warmer weather. The Losee PROTECT-O-MOTOR (Hot Spot) will do away with this inefficiency in vaporizing the gasoline and result in a big fuel saving to the car owner. Does away with fuel condensation in the crank case.

PROTECT-O-MOTOR (Hot Spot) is easily fitted on between the carburetor flange and the intake manifold. It operates through salvaging the hot gases from the exhaust pipe.

PROTECT-O-MOTOR (Hot Spot) has a Ready Made Market. Now is your chance to share in the big winter profit dividend. Write for full particulars and attractive proposition to dealers.

Made by

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### Gasoline Gauge

Fits the Ford  
and  
Chevrolet '4-00"



"Accurate  
to the Dot"

"Ends  
Guesswork"  
\$1.75

Order Thru  
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This is a gauge for Ford and Chevrolet "490" cars—and it sells on sight.

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**The AERMORE Exhaust Horn**  
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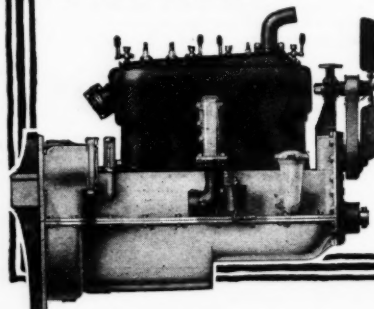
The initial cost of a WISCONSIN is slightly higher than that of ordinary motors because it costs more to build the WISCONSIN.

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CONSISTENT

motors leave the factory ready to run—all working parts adjusted to the thousandth of an inch, perfectly fitted, run-in, assembled, tested and inspected with absolute precision.

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\$1.50



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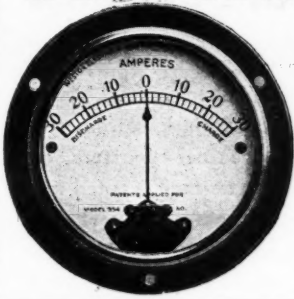
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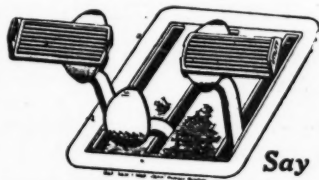
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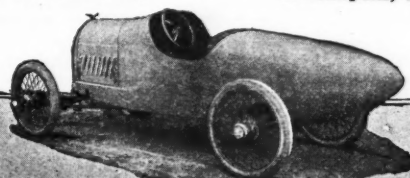
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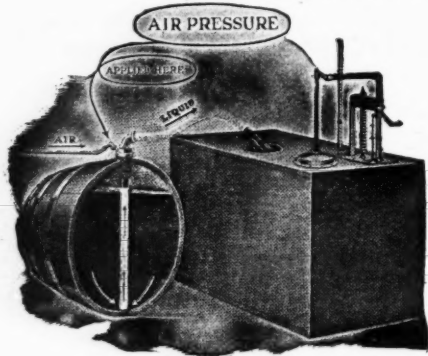


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INCOMPARABLE engine ability, axles, springs, brakes and frame of the best material, and above all, unexcelled workmanship, characterize KISSEL TRUCKS.

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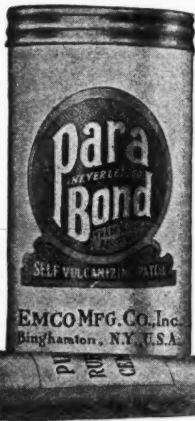
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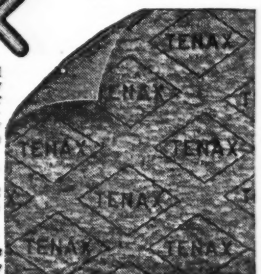
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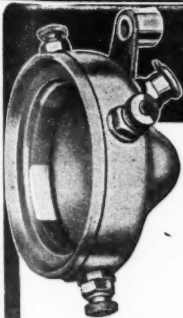
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Permanently ends ignition trouble and makes starting easy in wet weather.

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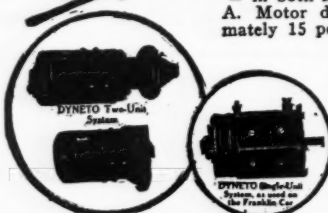


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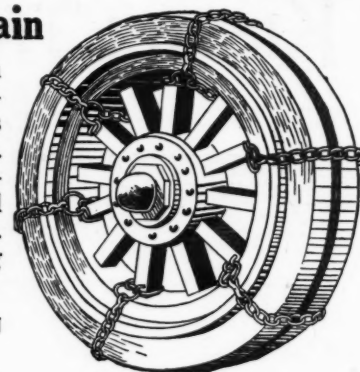


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**J. C. M. Radius Rod**



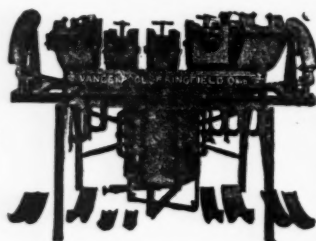
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It instantly removes all grease and grime, the easy scientific and harmless way.

Our Slogan  
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Ask your dealer or send 10c for your first cake.

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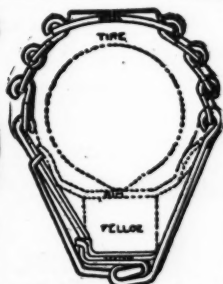
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These devices have exclusive advantages of design and construction.

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## 4-CYLINDER MOTORS

### FOR TRUCK OR TRACTOR

Power Plants That Have the Character and Stamina to Withstand the Most Drastic Tests  
**WAUKESHA MOTOR CO.**  
WAUKESHA, WIS.

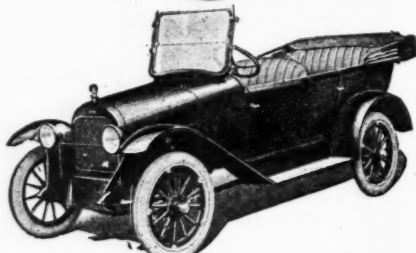
**ECLIPSE**

BENDIX DRIVE



For Electric Starters  
AUTOMATIC ENGAGING  
AND DISENGAGING

Used by

170 motor car and  
truck buildersECLIPSE MACHINE CO.  
ELMIRA, NEW YORK.**MOORE**

MOORE MOTOR VEHICLE COMPANY



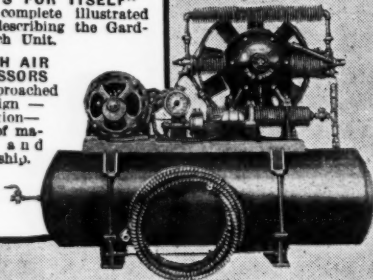
THE Mercer shield is the badge of fastidious taste in automobile. Mercer means the utmost in substantial smartness, riding comfort, and power. The possessor of a Mercer invariably feels a bit better satisfied than the owner of another car. Correspondence from dealers invited.

Mercer Automobile Company, Trenton, N.J.  
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**GARDNER**  
MONARCH UNIT  
2 AIR COMPRESSORS  
ARE UNAPPROACHED IN  
DESIGN—CONSTRUCTION—  
Quality of Materials and Workmanship

"IT PAYS FOR ITSELF"  
Send for complete illustrated  
literature describing the Gard-  
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MONARCH AIR  
COMPRESSORS  
are unapproached  
in Design—  
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**SERVICE STATION EQUIPMENT**

Equipment and Supplies  
for the

**MOTOR CAR—TRUCK—TRACTOR  
MOTOR-BOAT — A E R O P L A N E**

Machine Shop—Garage—Vulcanizing Plant  
OUTFITTERS

**BECK & CORBITT**

AUTOMOTIVE EQUIPMENT

First Street—Ashley to O'Fallon ST. LOUIS, MO.

**FIRESTONE DEMOUNTABLE RIMS**D  
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Values That  
Win Sales

*Hindview***Auto Mirrors**

attract customers by their neat appearance. Their moderate price makes selling easy. Their high quality insures satisfaction. Style F is for front fenders, with clamps for holding pennant staff. Our patented ball joint allows immediate adjustment to any desirable angle without use of any tool. Various finishes. Plain or lens mirror. Retail at \$2.50 up. Dealers and Jobbers, get our proposition.

**KALES STAMPING CO.**

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"See Our Exhibit at the New York and Chicago  
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3051

**Lethermet Nails**

Body builders who use these  
nails demand something more  
than the ordinary upholstery nail  
—that's why they use Lethermet  
Nails.

Lethermet Nails come enameled to match  
practically any shade of leather or up-  
holstering in plain or Spanish effects. Send  
for our catalog containing prices.

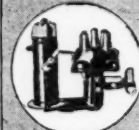
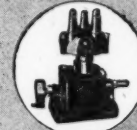
**THE BREWER-TITCHENER CORP.**

Makers of Standard Body Parts

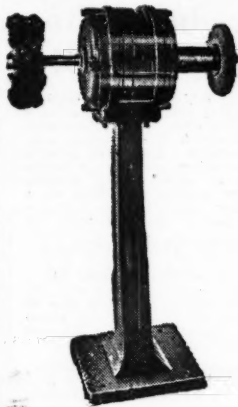
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**ATWATER  
KENT**

**AUTOMOTIVE EQUIPMENT***Ignition,**Starting and Lighting*

ATWATER KENT MFG. COMPANY Philadelphia



## Dealers! Garage Men! Repair Men!

Investigate the Le Bron Buffer and Power Plant. Air outfit connected if desired. 2, 3 and 5 H.P., any voltage; dust-proof and ball bearing motor.

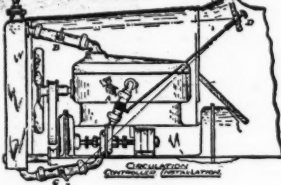
**USERS:** This outfit will pay for itself immediately

**Dealers:** Get our liberal proposition

Write for prices and information

**Le Bron Electrical Works**  
318 South 12th Street, OMAHA, NEBR.

**\$7.50 Complete**  
Ready to  
Put On



## TEMP-TROL

TEMPERATURE CONTROL  
PAYS FOR ITSELF IN  
FUEL SAVED

Easy to install—Fits any car  
The TEMP-TROL device is  
hand operated from the dash—  
the only positive method of  
temperature control.

Stops cold-weather starting troubles. Enables coldest motor to "heat-up" in 2 minutes. Exceptional seller. The profits are liberal.

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**DETROIT, MICH.**

Manufacturers of Johnson Carburetors



**MOTOR  
TRUCKS**  
1, 2, 3½,  
5 ton  
Worm-  
DRIVE

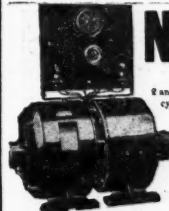
"All The Name Implies"



The best proof of the durability of STANDARD motor trucks is their actual service. Investigate what they are now doing on jobs of all kinds all over the world. Better still, compare their construction with other trucks of the same capacity, and you will find you are saving money by purchasing a STANDARD.

Dealers write for territory

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## NEW MOTORS

**FACTORY GUARANTEED  
ALL SIZES  
IN ORIGINAL BOXES**

Polyphase Motors		Single Phase Motors	
8 and 3 phase, A. C., 220 volts, 60 cycle, 1750 R.P.M., complete with base and pulley.		1/4 H. P., 110 volts, induction, full load start -	\$24.50
1/2 H. P. -	\$42.50	1/2 H. P., 110-220 volts, induction, full load start -	\$38.50
1 H. P. -	\$59.50	1 H. P., 110-220 volts, repulsion, for compressor -	\$46.50
2 H. P. -	\$72.50	1 H. P., 110-220 volts, repulsion, with sliding base -	\$67.50
3 H. P. -	\$84.50	2 H. P., 110-220 volts, repulsion, sliding base -	\$108.50
5 H. P. -	\$102.50	3 H. P., 110-220 volts, repulsion, sliding base -	\$124.50
1 H. P., high speed, 3600 R.P.M., 220 v.	\$36.50	5 H. P., 110-220 volts, repulsion, sliding base -	\$164.50
1 phase only -			

**Battery Charging Outfits**  
To operate on: A. C., 60 cycle, single phase. Voltage as specified.  
110 volts, 10 watts, 24 volts, without recharger - \$30.00 || 110 volts, 100 watts, 24 volts, without recharger - | \$40.00 |
110 volts, 100 watts, 24 volts, with recharger -	\$68.50
110-220 volts, 250 watts, 24 v., without recharger -	\$75.00
220 v., 250 watts, 24 volts, without recharger -	\$85.00
110 v., 275 watts, 24 volts, without recharger -	\$85.00
220 volts, 500 watts, 48 volts, with recharger -	\$110.00

WRITE FOR CATALOG. **1/4 SPECIAL** 1/4 H. P., 110 volts, 60 cycle, A.C., 220 v., S.P., 1750 R.P.M., complete with base and pulley. **WASHING MACHINE MOTORS** Suitable for operating hand-cranked washers, clothes wringers, etc. **\$19.75** Each. **GUARANTEE** 25% discount required on all orders. Balance C. O. D. by Express. Sight draft with Bill of Lading attached by freight. **MANUFACTURER'S DISTRIBUTOR** **CHAS. H. JOHNSTON, Box 20, West End, Pittsburgh, Pa.**



**Retail Price**  
**\$5.00**  
Set of  
Twelve

When attached to upper part of valve stem reduces the noise in any overhead valve motor by equalizing the lost motion between the valve stem and the rocker arm.

## Moore's Compensator

can be applied with perfect success on Buick, Oakland, Oldsmobile, Scripps-Booth and Chevrolet motors, reducing valve mechanism noises to a marked degree, giving to your motor a smooth, even tone.

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# BURD

## High Compression PISTON RINGS

*The Standard of Efficiency*

**BURD HIGH COMPRESSION RING CO., Rockford, Ill.**

**OUR 3-G MOTOR GENERATOR  
WILL MAKE YOU BIG PROFITS**

**ANYONE** can operate it. Reasonable in cost. Will make you more money with less time and labor, than any other department in your shop.

Our 3-G size charges from one to eight 6-volt batteries. Our 9-G size, one to twenty-four batteries.

Write for particulars. Already there are over 10,000 of our vibrating type Battery Chargers making big money for garage and repair men.

**ST. LOUIS ELECTRICAL WORKS,**  
4067 Forest Park Boulevard  
Saint Louis, - Missouri



## ZENITH CARBURETOR SUPREMACY

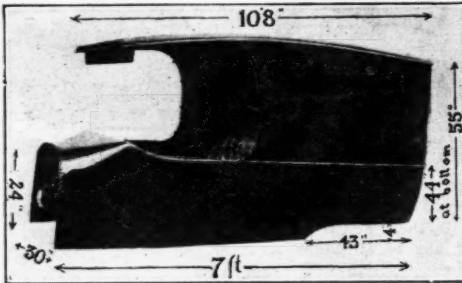
In carburetor Simplicity, Power Reliability and Economy is based upon certain proven facts—well-known to ZENITH users.

**ZENITH CARBURETOR CO.**  
New York DETROIT Chicago

## —DELIVERY WAGON BODIES—

Announcing another great purchase. These bodies are all new with cushions and filler coat of paint and can be made fit to most any chassis. Worth \$175.00.

**Our Price,  
\$45.00**



We also carry in stock Touring and Speedster bodies for all cars.

Write for our 32-page circular

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## Sell Your Product With MOTION PICTURES!



More and more goods are being sold through the medium of motion pictures. Hundreds of firms have films made showing their product in manufacture or actual operation. But finding theatres in which to show these commercial subjects is a real problem. Now that question has been solved. A new compact portable projecting machine makes it possible to show motion pictures anywhere. Your salesmen can project your films on a white wall, a window curtain, even on the ceiling—wherever an electric light socket is available—with the

### AMERICAN PROJECTOSCOPE

This machine is not a toy. It projects standard film—just like that shown in the theatres. It is compact, fool-proof—can be operated by anyone. Pictures may be run forward or backward—held stationary on the screen while being described. No danger of fire. Endorsed by experts. Send for descriptive literature and prices.

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"SIMPLY SHOW  
THE GOLDEN  
GIANT"

"IT SELLS  
ON SIGHT"

BENFORD  
LPG. CO.

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## Guaranteed for 10,000 Miles Bricton Pneumatic Tires

Every Bricton Tire is sold under a specific 10,000 mile written service guarantee. This guarantee is the longest and strongest ever put behind a pneumatic tire and is a positive protection to every purchaser. Bricton Tires are **Puncture-Proof**, and proof against blowouts, skidding, ruts, rim-cuts, oil and gasoline. Wonderful resiliency, easy riding qualities and economy commend them to every car owner.

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**FREE TRIAL OFFER**—To convince you Bricton Tires will give you satisfaction you may try them on your car at our expense. Write today for this Free Trial Offer, a copy of our guarantee and full information about Bricton Tires and Treads.

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## FREE BOOK "Care & Repair of Tires"



Tells how to get the utmost mileage from your tires—how to repair cuts, tears, punctures, blowouts, etc., why some car owners get over 15,000 miles from their tires—why sand pockets appear—why oil and water reduce the life of your tires—why spare tires deteriorate—what inflation to give your tires, etc.

This Free Book "Care and Repair of Tires" is just brimful of such tire-saving advice and information. Sent to any car owner on request. Write for it today.

C. A. Shaler Co. 252 Fourth St., Waupun, Wis.

## Crankshaft Machining Absolutely Accurate & Dependable

We have the knowledge and experience (20 years), the latest machinery, and the capacity to fill large orders promptly and exactly. Let us estimate on your work.



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**More Speed  
Less Spending**

**INSTALLATION** of a New Stromberg Carburetor on your car will "kill two motoring evils with one stone"—excessive fuel costs and lack of full, quick speed development. The many world speed acceleration, easy starting and power records captured by the new Stromberg Carburetor prove it best on any car for ordinary or most exhaustive road "trials." Send the name, model and year of your car for money-saving, mile-making information.

**Stromberg Motor Devices Co.**  
Dept. 127, 64 East 25th St., Chicago

**New STROMBERG Does it!**  
CARBURETOR

**SAFEGUARDS  
AGAINST  
THIEVES**

**POWERSTEEL  
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## TRED-WEL LAST-WEL TIRES TUBES

If your trade is showing dissatisfaction with the tire you are selling and if you would like a better selling plan than you have, write to us. We have an attractive proposition on a moderate priced tire.

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### Save Expense

Add to your hauling capacity at minimum cost by getting a Watson Tractor-and-Trailer outfit. Quicker, stronger, cheaper, easier to handle.

Write for literature

WATSON PRODUCTS CORP.  
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You can really EARN WHILE YOU LEARN to be an automobile expert at the Central Auto School. Awake to your opportunity and write now for details of our exceptional plan.

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## PRUYN BEARINGS AND PISTON RINGS

*The Greatest  
Assortment of Sizes  
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## Speedoline Saves 25 Per cent Gasoline



Speedoline—a chemical preparation—will save from 25 to 40 per cent on gasoline consumption and increase motor efficiency 30 per cent. It is absolutely guaranteed not to harm the finest motor. Write at once for our sales proposition.

An Automobile as a Premium to All Dealers Who Earn It  
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**Whirlwind  
Tire Pump**

Your customers cannot afford less efficient accessories. To serve their best interest sell the Whirlwind Pump and Peteler Jack

**Peteler  
AUTO JACK**

COE-STAPLEY MANUFACTURING CORP.  
Sales Office, 136 Liberty St., New York. Factories: Bridgeport, Conn.



Inner armor  
for automobile  
tyres pre-  
vents punctures and blow-outs. Double mileage of any tire, old or new, easily applied without tools. Used over and over in several tires. Will not heat or pinch. Cheaper and better than double treads, etc. Details free. Distributors and agents wanted. Sales guaranteed.

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AMERICAN ACCESSORIES CO., 250 Gulow St., Cincinnati, Ohio



## SERVICE SYSTEM VISIBLE GASOLINE

*The most reliable filling station made.  
Will make big profits for you.*

IDECO, Incorporated

Springfield, Illinois



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*"A Car of Rare Beauty"*

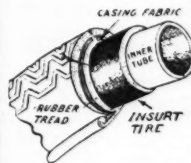
Manufactured by  
The Sayers & Scovill Co.  
Established 1876  
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## OSHKOSH 4-WHEEL DRIVE MOTOR TRUCK

THE TWO-TON TRUCK WHICH, IN ACTUAL PERFORMANCE, PROVES ALL CLAIMS MADE FOR IT.

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### DOUBLE TIRE MILEAGE

Eliminate Blowouts, prevent Punctures and double mileage. Easily adjusted without the use of tools. Automatically becomes part of tire.

Better and cheaper than retreading. Big Money Maker. Free details, write today.

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TRANSMISSIONS

## BROWN-LIPE-CHAPIN

DIFFERENTIALS

Factories & General Offices Syracuse N.Y.

## VIKING Brake Lining Exclusively for Fords



Specially woven, specially treated exclusively for Ford service. Its treatment will not wash out; contains no wires or compound to interfere with ignition system.

Sold in sets, with rivets, at \$1.50.

Vogt Manufacturing Corp., Rochester N. Y.

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Hand Tools  
Forgings



Forge Shop  
Machinery

**USL** storage  
batteries

machine-pasted plates



## FORD OWNERS

Investigate our **NON-BLOWOUT** expansion shells for **FORD MUFFLERS**.

Installed without removing muffler in **THREE MINUTES**.  
Guaranteed for the life of the car.

**RETAILS AT ONE DOLLAR**

**B & B PISTON RING REMOVER**—adjustable—takes any ring. Rings can be installed or removed without breaking. No injury to the mechanics' hands.

*Sold on a money back guarantee.*

Jobbers and Dealers—Cash in on these. Write for discounts.

**B & B MOTOR SPECIALTIES CO.**

607 North 13th Street

PHILADELPHIA, PA.

# The HUFFMAN TRUCK

**\$1495**  
With Internal  
Gear Drive

**\$1695** With Worm Drive

The Lowest Priced Truck in America for Its Carrying Capacity

**HUFFMAN BROTHERS MOTOR CO.**

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Branch and Show Room 2425 Michigan Ave., Chicago, Ill.



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### Tire Dressing Wheel

Equipped with removable blades having two wearing surfaces. Finest tool ever devised for removing dead rubber, for retread and half sole work.  
Price \$15.00. Extra blades \$3.00 per set.

Write for circular. Sold by all jobbers.

Manufactured by T. & T. Manufacturing Co., San Francisco, California

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ADJUSTABLE OPEN END

See Our Full Page Advertisement Next Week

**C. E. WAKEFIELD**

Wrench Manufacturers for Over Thirty Years  
WORCESTER MASS., U. S. A.

## DUESENBERG

Four cylinder Automobile Motor  
is now being built and sold by

Rochester Motors Co., Inc.,

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## PROTECT THE RADIATOR

The Warman Radiator Guard for trucks guarantees protection against radiator injury, the result of collision. Its basic patent design makes it the strongest guard on the market. Saves the truck owner new radiator or repair expense. More important, it prevents expensive lay-ups while new radiator is being shipped or repairs made at a distance. A direct-to-the-dealer proposition that is worth while. An interesting manufacturer proposition on stock equipment. Get the details.

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DETAILS TODAY**  
**TRINDL SALES CORPORATION**  
80 E. 24th St., Chicago  
Exclusive Distributors

Manufactured by Racine Auto Equipment Co. Racine Wis.

## Going and Coming you need



**NON-FLUID OIL**

WHEN YOUR car starts **NON-FLUID OIL** STARTS LUBRICATING AND as long as your car is running, it gives perfect lubrication without melting or wasting away.

Use K-00 Special for gears  
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Ask your dealer

**New York & New Jersey Lubricant Co.**  
165 Broadway, New York



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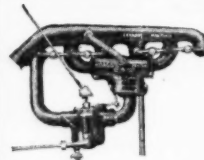
Products of the improved Gillette Chilled Rubber Process. Refining treatment that toughens rubber as iron is toughened by conversion into steel. Not affected by climatic conditions. Greatest mileage economy ever attained.

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Factory: Eau Claire, Wis.



**MAKE  
A FRIEND  
OF EVERY  
OWNER**



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**DEALERS:**—This device heats the intake manifold to a point where complete vaporization of fuel is assured even in coldest weather. The heated gases from the exhaust manifold do the work. A Ford necessity that increases mileage, cuts down fuel consumption, gives more power and minimizes carbon. A quick seller that satisfies the Ford owner and yields splendid profits. Write for the proposition.

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# LINN

GEARED TO THE GROUND  
**TRACTOR**

The most powerful hauling machine in the world. Makes all roads good roads. Capacity four times its own weight. Standard specifications. Catalog.

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## Battery Charging Pays Big Profits



HB Battery Charging Equipment will pay \$100 to \$400 a month **CLEAR EXTRA PROFIT**, depending upon size charger used. Motor Generator Type. No burn-outs or expensive renewals. No electrical knowledge required to install or operate. Gives sure, steady service with **BIG PROFITS**, 24 hours a day. We furnish also HB Ball-Bearing Motors, Generators, Belted Equipment, etc. All HB Equipment absolutely guaranteed. Sold on easy payments. Write for prices, terms and full information to:

**Hobart Brothers Company Box AR-12 Troy, Ohio**

Successful Manufacturers Since 1899

The Motor Truck bought today without Electric Starting and Lighting will be out of date to-morrow

# BETHLEHEM

Internal Gear Drive  
**MOTOR TRUCKS**  
Dependable Delivery

**BETHLEHEM MOTORS CORP., ALLENTOWN, PA.**

The Motor Truck bought today without Electric Starting and Lighting will be out of date to-morrow



## TRANSCO-FLUXOID

### For Repairing Scored Cylinders

A patented preparation which enables you to repair scores in cylinders cheaper, quicker and safer than regrounding or welding. One bottle (enough for several scores) and book of instructions, \$10.00. Every bottle guaranteed.

TRANSMUTED METAL COMPANY 3334 Chicago Ave.  
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MORTON W. SMITH CO., INC.  
19 West 44th  
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Announces that they are the sole distributors of the

## PORTER MOTOR CAR

"Designed and Built by Men Who Know How"

Designed by FINDLEY ROBERTSON PORTER  
Built by THE AMERICAN AND BRITISH MFG. CO.  
Chassis: \$6,500 F. O. B., Bridgeport, Conn.

Open Territory Write for Particulars




Does Not Collect Dust

Crystal contains no paraffin—nothing to leave the surface oily. It cleans—polishes and restores the factory finish, giving a lasting lustre. Dealers write for liberal proposition.

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## Crystal Polish



## Thomas Timer Elevator

Corrects Ford Ignition Troubles

The Thomas Timer Elevator corrects Ford Ignition Troubles—is comparable to the best ignition systems on the highest priced cars—and can be attached in twenty minutes. Dealers—Order from your Jobber.


THOMAS-ANDREWS CORPORATION  
Chicago  
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Factory, Waukegan, Ill.

# KokoMat

TRADE MARK REGISTERED U. S. PATENT OFFICE

For any width running board. The non-rattling, tight fitting mat that is making liberal profits for dealers in all sections of the country. The mat that stays clean, that stays put, that keeps the car clean and satisfies the customer. If you haven't secured territorial rights on this mat, write today.

Manufactured by KOKO MAT COMPANY, Inc., 110 E. 23rd St., New York City  
Sales Agents: Geo. E. LaVettes, Inc., 1834 Broadway, New York City



## Stewart Wire Wheels

### For Ford Cars - The Wheel that Won't Come Off.

With patented reverse taper construction and hub-cap wedges, wheel positively cannot come off by accident. Safety, beauty and comfort. Saves tires. Quick, easy changes. Set 5 wheels, \$70. Order through Ford dealer. Write for further information or dealer's proposition.

Stewart Wire Wheel Corporation  
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### The Stewart Hub Makes Safety Sure



## SEARING GREASE CUPS

TO BE FILLED WITH

## SEARING GREASE CARTRIDGES

The quick, clean way to "grease" any car.  
Manufactured by

## THE LEWIS SEARING COMPANY

DETROIT OF MICHIGAN MICHIGAN

## Johns-Manville

### NON-BURN

### ASBESTOS BRAKE LINING


H. W. JOHNS-MANVILLE CO.  
New York City  
10 Factories—Branches in 63 Large Cities

## PROGRESSIVE SALESMEN

of auto supplies who have a fixed territory basis a single item manufactured by the advertiser. It is an instrument which sells for One Dollar. It is on the market only two months. The most tangible proof of its merit in the shape of an astonishing large number of orders from owners of all makes of motor cars spread from coast to coast is on hand.

Dealers in automobiles as well as in supplies for automobiles repeat orders at frequent intervals.

ADDRESS BOX E-1068, Care of MOTOR AGE



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GUARANTEED FOR 18 MONTHS

Strictly quality batteries built of the finest materials and workmanship. Send for our distributors' and dealers' proposition.

Cole Storage Battery Co., 2439 Indiana Ave., Chicago.

## BIGGEST AND BEST STOCK

### New and Used Tires and Tubes

## BARGAINS GALORE

Write for prices—Special proposition to dealers

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## AUTO-STOP for FORDS

"You're Safe in its Grip"

Easily and quickly attached to rear wheel. Stops car from slipping back when stalled on hill or parked on incline. Saves tires and brakes. Prevents accidents and property damage.

WAYLAND SPECIALTY MFG. CO. Wayland, N. Y.  
Makers Finch Extension Door Latch and Wilkins Low Gear Control for Fords



## GREB AUTOMATIC GRIP PULLER

BENCH PATENT

There's no chance of this long-armed tool slipping—it grips the work like a vise, adjusting instantly—locking tight. Greb Arbor Press Base and Bench Plate attachment for Senior Puller gives you \$110 equipment for less than one-third that amount. Dealers and Jobbers—Write for our liberal discounts and 10 days' trial proposition.

THE GREB CO., 305 State Street, Boston, Mass.

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Air Cooled

### LIGHT WEIGHT — HIGH MILEAGE

Disc Wheels—Cord Tires \$2000.00  
(Three year dealer contracts)

## CAMERON MOTORS CORPORATION

2 COLUMBUS CIRCLE NEW YORK



## Starter Steel Ring Gears

for fly wheels of all cars

REPLACES the cast teeth of original fly wheel. Give diameter, and number of teeth, on fly wheel, and write us for prices.

Prompt Service

## KENT AUTO PARTS Co.

Denver, Colo.



## STANDARD RADIATOR

Make big money selling this 2½ in. brass core radiator. Interchangeable with regular Ford, fits Ford shell. Retail Price complete \$21.00. Less shell \$19.50.

## STANDARD RADIATOR CO., Inc.

SPRINGVILLE, NEW YORK

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"Before you decide, take a Briscoe ride," has become almost a rule among buyers of popular-priced cars.

**BRISCOE MOTOR CORPORATION**, Jackson, Mich.  
The Canadian Briscoe Motor Co., Limited, Brockville, Ontario



**The Federal Corporation**  
150 No. Elm St.  
Westfield, Mass.



**FOR YOUR PARTICULAR CUSTOMER!**  
The Windshield that stays put at any angle. Are you selling it? Not cheap, but mighty profitable. Send for descriptive booklet.  
**PERKIN'S TONNEAU WINDSHIELD CO., Inc.**  
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**PERKINS TONNEAU WINDSHIELD**

**A Few Live Dealers Wanted for**  
**MUTUAL**  
"America's Greatest Truck"  
2-3½ and 5-ton, with Electric Light, Enclosed Cab, and Metal Wheels as part of regular equipment.  
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Bulldog Tread — Non-Skid  
Fabric — plain Tread and  
Super Cord.

DEALERS—We have a  
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WRITE

6,000 Mile  
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Distributed by  
**ACORN**

10,000 Mile  
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1350 Michigan Ave.

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### ULTRA GLASS

absolutely impenetrable and non-scattering under direct impact or indirect concussion (e. g., door slam). Finer than the finest plate glass in appearance. Send today for a sample and our sales proposition.

**Glass Founders Corporation** Milltown, N. J.

IT'S SAFE!  
**OPCO**  
IT SELLS!

The Oil That  
Removes  
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An assortment of ten or twelve clean, new, fresh pieces of soft cotton flannel, domet flannel, blanket pieces and toweling particularly adapted for automobile cleaning, \$1.25 per package.

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Swings in a 9-ft. circle.  
Water and light where  
you need them.

All joints guaranteed

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SELF-SEATING  
LAMINATED VALVES  
Sensible-Logical-Inevitable  
A Valve-Seal Carbon Remover  
at Work While You Drive

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Save 25% to 40% of Gasoline

WRITE US ABOUT IT

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Black Finishing and Rubbing

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Guaranteed  
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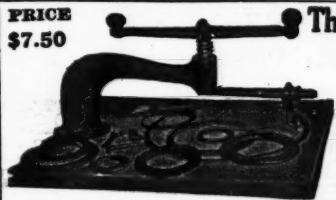
EVERYONE  
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IT

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TIRES AND TUBES

There will be more Brunswick Tires in use on every tomorrow than there were on any yesterday. For Brunswick Tires must live up to the reputation established by seventy-four years spent in the making of super-products.  
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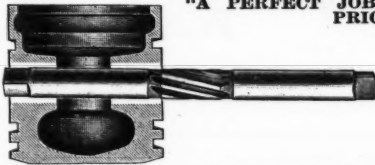
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Lamp Glass, Sheet Copper  
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Capacity any size circle from 9 to 14 in.  
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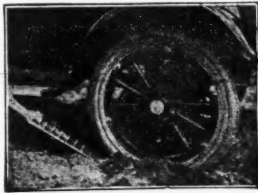


Reams both bushings  
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line. Fully guaran-  
teed. Get my cata-  
log. Complete Ford  
Shop Equipment.  
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Prevents wheels spinning when car is  
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perfect traction. Makes bad roads safe.  
Does not damage tires. Also used as shovel  
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### EQUIPMENT FOR FORD CARS

Our 1920 catalog is now ready for  
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### Edward A. Cassidy Company

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Long Horn G-Piel Muffler Cut-Out  
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About

**STEWART CUSTOM-  
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A STRONG, BEAUTIFUL STEEL WHEEL THAT  
WON'T BUCKLE AND CAN'T COLLAPSE, AND  
THAT AFFORDS THE RESILIENCY NECESSARY  
TO THE ULTIMATE IN CAR COMFORT.

**HARVEY**

STEEL WHEELS  
HARVEY RIM & WHEEL COMPANY, BUFFALO, NEW YORK U.S.A.

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FOR FORD DEALERS AND JOBBERS

#### The DORIC

Rolls-Royce Type Radiator  
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Permanently Beautiful

Better Cooling, Less Trouble, Longer Life. Write for Proposition

**The MOTOR TRUCK RADIATOR & MFG. CO.**

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Indestructible Radiator for  
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—the new fire-fighting dry chemical guaranteed to extinguish  
a fire in less than two seconds. It is put up in one-fourth  
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power of 41 gallons of water.  
Feumort has no pumps or valves to rust or corrode. Fits  
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MAKE GOOD—OR WE DO

Dealers Sell Them On That Basis

Hill 3-A Spark Plugs cannot short circuit, leak  
compression, foul, or break. The design specifi-  
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They will GO ON and STAY on the meanest  
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prove it. Price \$1.25. Liberal discounts.  
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**Commerce**  
TRUCKS

"For Business"

1-1½ and 1½-2 Ton  
CAPACITIES

### FULLY EQUIPPED

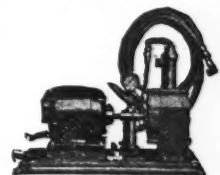
with impulse starter,  
electric lights, wind-  
shield and bumper.

The Commerce Motor  
Car Co.  
Mfrs. of Motor Trucks  
DETROIT, MICHIGAN  
9th Year

*The*  
**"LongStroke"**  
COMPRESSOR  
(Write for descriptive folder)

**MOTOR-COMPRESSOR CO.**

52-60 Dickerson Street, Newark, N. J.



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Preferred and used by the largest tire factories in America.  
Consult us before remodeling or increasing your facilities.

**THE WILLIAMS FOUNDRY & MACHINE CO.**

Everything in Tire-Repair Machinery and Tools. Akron, Ohio

### SERVICE STATION—ELECTRICAL REPAIRS GENUINE PARTS AUTO - ELECTRIC & SERVICE CORP.

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FACTORY REPRESENTATIVE FOR

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THE  
COMPLETE  
TRUCK

Full Line of Sizes Completely Equipped

No Extras to Buy Except Body

**NELSON MOTOR TRUCK CO., Saginaw, Mich.**

### "ANYTHING AND EVERYTHING FOR AN AUTO" TIMES SQUARE AUTO SUPPLY CO.

"World's Largest Auto Supply House"

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We operate 27 direct branches in 23 leading cities  
Send for our complete catalog

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OF THE MOTOR INDUSTRY

FOR PARTS, ACCESSORIES, TIRES, MACHINERY, REBUILDING, REPAIRING, WELDING AND USED CARS. ALSO HELP AND SITUATIONS WANTED AND MISCELLANEOUS CLASSIFIED ADVERTISING

## IF IT'S AUTO PARTS YOU WANT Wire-Write or Come to Warshawsky—

Every Used Part Is in First Class Condition, and Will Render Satisfactory Service. If We Cannot Satisfy You, Your Money Will Be Cheerfully Refunded

### SPECIAL MOTOR BARGAINS

All in Excellent Condition

#### UNIT POWER PLANTS

Stearns Knight 8 with starter and generator complete.....	\$225.00
1917 Cole 8.....	150.00
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Stoddard Knight 6 cyl.....	200.00
Hershoff Spillman 6 cyl.....	175.00
Continental 6 cyl. with starter.....	150.00
Hershoff Spillman 4 cyl.....	150.00
Model engine 4 cyl.....	125.00
Jackson 4 cyl.....	150.00
Haynes 4 cyl.....	125.00
Allan 40 4 cyl. with gen.....	125.00
Continental 4 cyl. with mag- neto.....	175.00
Lozier 4 cyl.....	100.00
Wisconsin Out of Cutting 4 cyl.....	100.00
Menominee 4 cyl.....	100.00
Rutenber 4 cyl.....	100.00
Master 6 Chalmers 6 cyl.....	125.00
Knox 6 cyl.....	175.00
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Patterson Northway 4 cyl.....	125.00

#### MOTORS—ONLY

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Continental C 4 cyl. with starter.....	100.00
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Northway 4 cyl.....	100.00
Stoddard Dayton 4 cyl.....	100.00
Packard 18 4 cyl.....	125.00
Overland 83 en-bloc.....	100.00
Overland 69.....	85.00
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Marion Stutz New 4 cyl.....	125.00
Marion Stutz 4 cyl.....	100.00
Juda 4 cyl.....	90.00
Alco 4 cyl.....	75.00
Wisconsin 4 cyl.....	125.00
Mitchell 1913 T Head 4 cyl.....	100.00
Knox 4 cyl.....	100.00
Reo 4 cyl.....	75.00
Staver 4 cyl.....	90.00
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Pennault 4 cyl.....	90.00
Reo 4 cyl.....	60.00
Premier 4 cyl.....	100.00

WE BUY  
BOSCH  
MAGNETOS

Hair and Leather in  
Any Quantity

#### MOTOR GENERATORS

Wagner 13 Studebaker.....	25.00	Remy 5, 6, 3, SJ2, 535.....	35.00
Jesco.....	25.00	Disco 16 E—12 volt.....	35.00
20 Delco.....	30.00	Apple Mod 28 A.....	25.00
Gray & Davis 2 Unit.....	35.00	Intz Chalmers.....	35.00
Westinghouse S W 1158 A.....	30.00	Northeast.....	20.00
New Remy Model 180B 6 volt Starter and Generator.....	60.00	Apple—A28 for Mitchell.....	25.00

#### MAGNETOS

Overhauled and Guaranteed	
New DU4 Variable.....	\$35.00
DU4 Bosch Set Spark.....	25.00
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DR4 Bosch 2 spark.....	65.00
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DR6 Bosch 2 spark.....	75.00
D4 Bosch.....	15.00
D6 Bosch.....	17.50
D6 Bosch 2 spark.....	45.00
NU4 Bosch.....	15.00
ZR6 Bosch.....	50.00
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Eisemann Dual.....	15.00
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New Dixie Mags. 4 cyl.....	18.00
New Sims H T.....	18.00
Mea.....	12.00
New Splittorf Type 2.....	13.00

#### COILS

Bosch Type A.....	\$7.50
Bosch Duplex.....	4.00
Eisemann.....	4.00
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Silent Starter and Generator Chains; all lengths and sizes.....	
New 8-cyl. Delco distributors.....	12.00

#### GENERATORS

New Remy Generators (Round Type) with relay.....	18.00
Westinghouse with distributor 230-221.....	25.00
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Ward Leonard AG T.....	10.00-12.00
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Vesta.....	12.00
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Allis Chalmers.....	15.00
Remy 132.....	20.00
Packard.....	20.00
Deaco.....	20.00
Starter for Palmer Singer.....	20.00
Westinghouse 533-S W 103.....	25.00
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Wagner for King.....	20.00
Autolite No. 7049-2407-6145.....	15.00-20.00
Autolite for Abbott.....	15.00
Gray Davis Chalmers.....	20.00
Leece-Neville Haynes.....	20.00
Gray Davis, Lozier and others.....	30.00
Autolite, Overland 79, 81, 82.....	15.00-20.00

#### SECOND-HAND CAR DEPT.

\$150.00 to \$550.00  
50 to 75 exceptionally good used cars  
at prices so low that they would even  
interest dealers.

#### SPEEDOMETER HEADS

Stewart or Warner.....	\$1.50 to \$4.00
New Stewart flush type.....	5.00
Pyrene Fire Extinguishers.....	6.00

DEPOSIT REQUIRED

WITH

ALL ORDERS

### Specials for Winter Business

Ford Hood and Radiator Covers.....\$2.50

Heaters for All Cars

New Radiators for All Cars

New Cushions for All Cars

### COMPLETE LINE OF NEW PARTS For All Standard Makes of Cars NEW & USED GEARS & BEARINGS

#### Specials in New Parts and Material

New Ford Racing Bodies, hoods, Radiator Shell, Upholstered, prim- ing coat, crated for delivery.....	\$45.00
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New 1 and 1 1/2 ton truck bodies.....	\$60.00
New Elgin Chummy Roadster Tops, complete with curtain and top boot.....	\$25.00
New Channel Bar Black Bumpers for Fords.....	3.50
New Channel Bar Bumpers for all cars, black enamel or nickel.....	4.50
New Autolite ammeters, 20 amp., \$1.50; 30 amp.....	2.00
New One-Man Top Wind- shields.....	8.00
Connecticut 3-button switches.....	1.75
National Standard Medium Jacks.....	1.50
Heavy Grease Guns.....	.50
14,000 ft. new radiator hose. Price per ft., 1-in., 15c; 1 1/4-in., 17 1/2c; 1 1/2-in., 20c; 1 3/4-in., 22c; 2-in., 25c; 2 1/4-in., 27 1/2c; 2 1/2-in., 30c; 2 3/4-in., 32 1/2c.....	\$0.35
Tortoise Shell Goggles.....	\$0.35
New Johnson Shock Absorbers, complete, per pair.....	\$10.00-12.00
Master Vibrators for Fords.....	3.00
New Bailey Differentials for Overland Models 80, 81, 83.....	\$10.00

New Running Board Tire Brackets for all cars, per set.....	\$1.50
New Hand Horns.....	2.00
Double Barrel Pumps.....	2.50
Single Barrel Pumps.....	1.50
Head Lights for Fords, Pair.....	3.50
New Radius Rods for Fords.....	1.75
Top Dressing, 1/2 pt. can.....	.35
Ray Shock Absorbers, for Fords, set of four.....	5.00
Radiator and Hood Covers, for all cars.....	5.00

#### NEW LAMPS

11 inch single bulb.....	\$6.00
10 inch single bulb.....	5.00
Electric tail lights.....	.85
Electric side lights, pair.....	1.75

#### NEW BRAKE LINING

Price per ft.	
1 1/4-in., 20c	1 1/2-in., 25c
1 1/2-in., 30c	2-in., 30c
2 1/2-in., 35c	3-in., 40c

#### FLEXIBLE TUBING

Price per ft.	
1 1/4-in., 25c	1 1/2-in., 30c
1 1/2-in., 35c	2-in., 40c
2 1/4-in., 45c	2 1/2-in., 50c
	\$10.00

### PREST-O-LITE TANKS

Model B.....	\$5.00 each; E.....	\$3.50 each
Searchlight Tanks.....		\$2.50

New and Used Rims—All Makes

New Pneumatic and Solid Truck Tires

GOOD USED TIRES AND TUBES

OBTAINED FROM WRECKED CARS—WRITE FOR PRICES

MAIL ORDERS SHIPPED SAME DAY

HIGHEST PRICES PAID FOR WRECKED CARS

# WARSHAWSKY & CO.

LARGEST CAR WRECKERS IN THE WORLD

1915 SOUTH STATE STREET

PHONE CALUMET 7315

CHICAGO, U. S. A.

# PARTS FOR ALL CARS

We Save You 50 to 80% of the Original Cost

Satisfaction or

Your Money Back

New Spotlights, 5 in. lens with mirror ..... \$3.48

Prest-O-Lite Tanks

Model B.....\$5.50 ea.

Model E.....4.00 ea.

Searchlite Tanks 2.50 ea.

COILS

Bosch Type A.....\$6.50  
Eisemann.....3.50  
Splittorf.....3.50

STARTERS

Gray & Davis.....\$14.00  
Auto Lito, Bendix Drive.....17.50  
Jones Starter and Generator.....20.00

GENERATORS

Gray & Davis.....\$14.00  
Remy.....12.00  
Vesta.....10.00  
Silent Starter and Generator  
Chains, all lengths and sizes.  
Lighting and Starting Batteries.....\$6.00 to \$15.00  
Rims.....1.50 to 3.50  
Carburetors.....3.50 to 7.50

5% Off for Cash in Full with Order.  
Deposit Required with All Orders.  
Get Our Prices on New Tires.

Magnetos Overhauled and Guaranteed

Bosch DU4 Variable.....\$27.50	Bosch D6.....\$17.50
Bosch DU4 Set Spark.....25.00	Bosch DR6.....22.50
New Bosch DU4 Variable.....35.00	Bosch ZR6.....35.00
Bosch DU6.....29.00	New Bosch ZR6.....40.00
Bosch DR4.....19.50	Bosch D4 ZR6.....15.00
	Bosch D6.....\$17.50
	Eisemann.....12.00
	G4 Eisemann (water-proof).....22.50
	Remy.....6.00
	Dixie.....12.00

New Gears for All Cars

REBUILT BATTERIES	
Guaranteed for 6 Months	
6 Volt Starting and Lighting Batteries.....\$13.50	
12 Volt Starting and Lighting Batteries.....18.50	

MOTORS

In Excellent Condition	
Continental, Model E.....\$75.00	
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4 cyl. Studebaker 23.....50.00	
4 cyl. Everett 30.....45.00	
4 cyl. Davis 30.....50.00	
Overland 69.....60.00	
Overland 83A with starter and generator.....100.00	
Overland 83B block motor with starter and gen.....90.00	

UNIT POWER PLANTS

Continental, Model E.....\$115.00	
Chalmers 30.....65.00	
Ruttenberg Cyl. both.....80.00	
Radiators.....\$10.00 and up	
Speedometer Heads.....\$1.00 to \$3.00	
Axle Shafts.....2.50 to 7.50	
Front Axles.....Springs	
Rear Axles.....Transmission Gears	
Transmissions.....Differential Gears	
Roller Ball Bearings (All Makes).....\$1.00 to \$3.50	
Pistons, Cylinder Blocks, Crank, and Camshafts, etc.	

Full Cash Refunds, less Express Charges, Allowed on Returned Goods.  
Prompt Attention to Your Orders.

## OUR SLIGHTLY USED TIRES AND TUBES

OBTAINED from WRECKED CARS

Mean Economy to You—A Trial

Will Convince You

Size	Tires	Tubes
30x3	\$ 4.50	\$1.35
30x3 1/2	5.50	1.45
31x3 1/2	5.75	1.50
32x3 1/2	6.00	1.50
31x4	6.50	1.60
32x4	7.00	1.65
33x4	7.75	1.60
33x4 1/2	8.00	1.70
34x4	8.50	1.75
35x4	9.00	1.75
34x4 1/2	9.00	1.75
35x4 1/2	9.25	1.80
36x4 1/2	9.50	1.85
38x4 1/2	15.00	2.50
40x4 1/2	15.00	4.00
42x4 1/2	25.00	2.00
35x5	10.25	2.00
36x5	10.25	2.00
37x5	10.75	2.20
38x5 1/2	15.00	3.6x4
38x5 1/2	15.00	33x4 1/2
40x4 Non Skid.....15.00		34x4 1/2
		35x4 1/2

## Double Tread Tires

Selected from best used material obtainable.

Reliners Free with Each Tire

Two tires, one with good top and other with good sidewalls are trimmed, cemented and sewed firmly together by Campbell lock stitch method, twelve to fourteen plies fabric making puncture and blowout almost impossible.

Size	Complete tire	You furnish one tire	You furnish both
28x3	\$ 4.15	\$ 3.00	\$ 1.50
30x3	4.75	3.35	1.50
30x3 1/2	5.80	4.25	2.00
31x3 1/2	6.50	4.50	2.00
32x3 1/2	6.75	5.25	2.00
31x4	7.00	5.60	2.25
32x4	6.95	5.75	2.50
32x4 1/2	7.15	5.65	2.50
33x4	7.80	6.25	2.50
34x4	8.00	6.45	2.50
35x4	8.75	7.15	2.50
36x4	9.40	7.50	2.50
33x4 1/2	9.25	7.60	3.00
34x4 1/2	9.65	8.00	3.00
35x4 1/2	10.15	8.30	3.00

Express Must Be Prepaid on Old Tires Sent to Us.

## Special New Clincher Tires

32x4.....\$10.00	33x4 1/2.....\$12.50	34x5.....\$12.50
------------------	----------------------	------------------

# MOTOR SALVAGE CO. 1425 S. State St. CHICAGO, ILL.

## Auto Accessories, Parts and Equipment AT CUT PRICES

Special Prices on

### BOSCH MAGNETOS

New DU4 variable spark.....\$32.50	
DU6.....30.00	
DR6.....20.00	
Rebuilt DU4—all models.....25.00	
Two Spark ZR4, forelan waterproof.....80.00	
Two Spark ZR4 American.....40.00	
Two Spark ZK4.....35.00	
Simms SU4.....15.00	
Radiator Hose, any size, 18 ft. (3-ft. lengths.).....(3-ft.)	
B & W or Autolite Dash Ammeters, each.....\$1.35	
Stanley Skid Chains for solid tires, both single and dual, all sizes, per pair.....7.95	
Stromberg LE2, 1 1/4-in. side inlet carburetors, new.....7.50	
Miller Racing Carburetors, 1 1/2-in. top inlet, new.....9.00	
We can furnish any make of used carburetors for all cars at from \$4.00 to \$10.00.	

### New and Used Overland Motor Parts

For All Models

This consists of a big lot of new 83B and 85-4 Motors, complete and in parts which were purchased from the British War Mission which we can offer at a great saving.  
Motor complete with clutch and flywheel.....\$150.00  
With new Bosch DU4 magneto and new Autolite starter and generator.....215.00

New Parts for 83B and 85-4

Cylinder Block.....\$24.50	
Crankshaft.....16.50	
Connecting rod assembly with piston and rings complete.....7.50	
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Cam Shaft.....5.00	
Complete Set of Timing Gears.....3.50	
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A No. 1 Axle Shafts for all Overland and Studebaker Cars.....3.25	

WE CAN FURNISH NEW AND USED PARTS FOR ALL MODELS OVERLAND CARS, such as transmission cases, rear axle housings, gears, wheels, clutches, flywheels, etc., at lowest prices. All orders shipped immediately—no delay.

### Woods Mobilette Service and Parts for All Cycle Cars

We have recently purchased all parts and equipment from the manufacturers of the WOODS MOBILETTE and are in a position to furnish these parts at a great saving in price.

### SPECIAL BARGAINS

500 Radiators. Built for Woods Mobilette.	
15 Wide 30 high. Can be used for tractors, speedsters, and cycle cars, each, \$7.50.	
400 Woods Open Delivery Bodies that can be made to fit a Ford or any light delivery car. While they last, \$20.00.	
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Slightly used tires from \$5.00 to \$15.00.	

All Goods Shipped C. O. D. Subject to Inspection.

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For Pleasure Cars and  
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10,000 AXLES  
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PINIONS, REAR AXLES, JACK-SHAFTS, SPRINGS AND TRANSMISSION GEARS,  
FOR FOLLOWING CARS

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Knox  
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Overland (all  
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Paige  
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Pullman  
R-C-H  
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Rush  
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We Match or Make All  
Parts the Day We  
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"A MILLION PARTS"

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PARTS FOR MOST MAKES OF CARS AT 25% TO 75% OFF LIST PRICE

Write, wire, phone or send old parts for duplication. Old parts returned prepaid if not duplicated. Satisfaction guaranteed or money cheerfully refunded. Largest Auto Parts concern in State.

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Buy your repair parts direct from  
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We carry a complete stock of repair parts and can make shipment the day order is received. Our stock includes a complete supply of Weidely 12-cyl. motor parts.

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Prompt Service—Satisfaction Guaranteed—Money Cheerfully Refunded

New Gears and Shafts for 200 Cars. Prest-O-Lite Tanks, Model B, \$5.00; Model E, \$3.50. Searchlight Tanks, \$2.00.

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Bosch D. U. 4, Set Spark.....\$22.50  
New Bosch D. U. 4 Variable.....32.50  
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Bosch D. R. 4.....20.00  
Bosch D. R. 4—2 spark.....65.00  
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Eisemann 4 Cylinder.....12.00  
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Gray & Davis.....\$15.00

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**MOTORS ONLY**  
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All Makes and Sizes.....\$2.00 up  
All Parts for 2 Cylinder Grabowsky Trucks.  
Front and Rear Axles, Axle Shafts.  
Complete Rear Ends.  
Transmissions—Universal Joints.  
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**REBUILT BATTERIES**  
Guaranteed for 6 Months  
6-Volt, Starting and Lighting.....\$13.50  
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EXCELLENT 2nd HAND TIRES AND TUBES Obtained from Wrecked Cars—Solid Truck Tires  
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And furnish them when you want  
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Our stock of parts is large and complete. Our service is as good  
as you will find anywhere. All our goods are sold on a money back  
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We Specialize In Parts For:

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**Special Bargains In Magnetos**  
Bosch, high tension, D4.....\$18.00  
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## BRAND NEW MOTORS

4 Cylinder Model 85 Overland

**\$125**

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Don't pay a premium for, nor run the risk of using, second-hand parts when you can get **NEW PARTS**, exact duplicates, made from original patterns, by ordering direct from the factory that built your motor.

Deal with headquarters and be assured of good reliable parts at a fair price.

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Buy your repair parts direct from the manufacturer of your car. We carry a complete stock of repair parts and can make shipment the day order is received.

We operate the original factory service department.

**MARION MOTOR SERVICE CO.**

**Indianapolis, Ind.**

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Don't Buy Junk Parts. Try Puritan Way—It Pays. We Do Not Wreck Cars

### NEW PARTS FOR ALL CARS

Gears, Axle Shafts, Rear Axles, Transmission, Motor and Clutch Parts, Universal Joints, Piston Rings, Bearings, Fenders, Wheels, Rims, etc.

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Piston Pins ..... \$0.50  
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#### ELECTRICAL REPAIRING

Gears, Axle Shafts, Rear Axle, Transmission, Motor to any make of Starter, Generator, Ignition System, Coil, etc.

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#### NEW AND GUARANTEED

6-volt, 80 ampere ..... \$25.00  
12-volt, for Dodge and Maxwell ..... \$6.00

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Suitable for all makes of cars.  
**MAXWELL, DODGE, CHEVROLET 490, BRISCOE, ALL NEW AND COMPLETE WITH CURTAINS AND DUST BOOTS—While they last.....\$25.00**

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#### COILS

Bosch Dual type "A" ..... \$10.00  
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#### REPLACEMENT COILS FOR ALL CARS

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Speedster Bodies ..... \$60.00  
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Electric Lighting System, complete with Battery, Generator, Electric Slide and Tail Lamps, etc..... 17.50

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We have an enormous stock of all makes and sizes of demountable rims and wheels—have them right in stock, and can make immediate shipment.

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Brand new Honeycomb Radiators for all makes of cars; guaranteed to be right. No matter what car you may need a Radiator for, write for prices.

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**"We Tear 'Em  
Up and Sell  
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Parts for Over 300 Makes of  
Cars

### SPECIAL

**Curtiss Aeroplane  
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In Perfect Mechanical Condition  
A BARGAIN!

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ELECTRIC MOTOR DRIVEN GARAGE PUMPS. EXHAUST FANS AND BLOWERS. GRINDERS AND POLISHERS, DRILLS AND TOOLS.

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Super Six, 1916, less transmission ..... \$200.00  
Stearns-Knight, fully equipped, Bosch Dual magneto, Vestal generator, Rayfield carburetor, ammeter, and all switches and gauges, complete ..... 200.00

This motor is worth \$1250.00 and is as good as new

Oakland Six, unit power plant, Delco system, Stromberg carburetor ..... 150.00

Studebaker "25", complete with magneto and carburetor ..... 40.00

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Wisconsin taken from Cutting, unit power plant, Kemy ignition, Rayfield carburetor ..... 85.00

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One Rex, marine engine, two cylinder, two cycle, 10-14 horse power ..... 50.00

Send us your order for auto parts. Used parts in first-class condition at one-half price. New gears for all makes and models of cars at factory list. New Bosch magnetos at \$50.00; used D U 4, \$35.00; variable spark, \$35.00, set spark, \$25.00. These motors and magnetos are all in first class shape.

1910 forty-eight-six cylinder Pierce-Arrow Chassis, runs like new ..... \$750.00

Special factory built National for racing. Series 8 has been on track and won ..... 500.00

Deposit of 20 per cent required on all orders.

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## MOTORS & SUPPLIES

1-in. to 2 1/2-in. Radiator Hose, per foot ..... \$ 0.18

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Solid Tire Wheels with 37x2 Tires, hubs and sprockets, new, each ..... 7.50

750 Stromberg Carburetors, M 3/4-in. ..... 7.50

200 Stromberg Carburetors, K-1, 1-in. ..... 8.00

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500 Magneto couplings, universal ..... .75

10,000 Hardened Set Screws, 5-16-in. and 3-8-in., 1-inch to 2-inches long, per hundred ..... 1.25

1,000 Hyatt Bearings, 1-in. Shaft, 3 1/2-in. long ..... .30

Brake Lining, nearly all sizes, per foot ..... 8.00

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All other sizes, Non-Skid Tires ..... 2.25

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Motors, all kinds, up from ..... 10.00

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Pneumatic Tire Wheels for Ford Trucks.

Five Detachable Wire Wheels for Fords.

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Transmission and Differential  
Gears in Stock

New and Guaranteed  
For Over 100 Different Makes  
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Prompt Shipments. Money Refunded on  
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We Have Parts for the Following Cars:  
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Burg: 40 Case: 40 King: 36; Krit: 20 Paige: 6-16  
Carter Car: 5A- Kissel Kar Rider: 1915  
L&R Knox: 40; Little Regal: 20-30-  
Chalmers: E-F- Lamber: 2&4 Cyl. Underslung-  
L-M-10-Six- Lexington: 40 1915  
36: 6-18; 6-24; 40 Marithon: 30-40 Reo: 2&4 Cyl.  
Chevrolet: B. G. Marmon: 32 4th-5th  
4-90 Clark: 40 Maxwell: 2&4 Cyl. F-K-Q- Rambler: 34-40-  
Cadillac: 1909- 25-1913-14-15- 53-Cross  
10-11-12-13 Cyl. F-K-Q- 25-1913-14-15- Country  
Crawford Mitchell: 6-40; 15 Moon: 40 R. C. H.  
Cameron E. M. F.: 40 Moline 1914; 6-35; Studobaker: 25-  
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Firestone Co. Michigan: 40 Saxon Sellers  
Lumbia Fuller Monro: Metz Stanley Steamer:  
Ford: N-R-S New Erie 1918  
Great Northern Oakland: 2&4 Stearns Knight  
Hershoff Cyl.: 40 Stoddard Dayton  
Haines: 1910-12 Overland: 30-32- Velle: 30-40; 6-  
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Complete Motors, Transmissions, Rear Axles. Money  
Refunded on All Parts That Are Unsatisfactory if  
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We specialize in automobile parts.

We carry parts in stock for more than  
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We have also a \$10,000 stock of new  
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# Speed or Power

for the Ford or Chevrolet 490.

INSTALL A SET OF:

234—1 Gears in the Race Type  
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OUR TRADE MARK—A star on  
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All ratios \$15.00 set.

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**PARTS**  
ALWAYS TEARING 'EM UP—  
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YES!  
PARTS FOR  
ALL CARS

Magnetos,  
Gears, Motors,  
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Radiators  
Axles  
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ALSO TIRE  
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# AUTO Save 50-90% PARTS

for 400 Cars

1910-1919 Buick, Cadillac, Dodge, Stude-  
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Motors .....	\$25.00 up	Presto Tanks .....	\$ 4.50 up
Magnetos .....	4.00 "	New Spotlights .....	2.00 "
Carburetors .....	3.00 "	Generators .....	10.00 "
Rear Axles .....	15.00 "	Gears .....	1.00 "
Front Axles .....	5.00 "	Bearings .....	1.00 "
Cylinders .....	5.00 "	Radiators .....	10.00 "

Jobbers in Bankrupt Auto Supplies

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Largest Exchange in New England

# Attractive Prices on New GENERAL ELECTRIC MOTOR GENERATOR SETS FOR RE- CHARGING BATTERIES

For Sale, subject to prior sale, and F. O. B.  
Chicago:

110-Volt 60-Cycle A. C. Sets with panel—  
250 Watt ..... \$ 83.00  
375 Watt ..... 108.00  
500 Watt ..... 118.00

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500 Watt ..... 118.00

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# NEW GEARS

FOR ALL MAKES OF CARS

Transmission and Differential Gears

AT A SAVING

Also Axles, Universal Joints, Clutch  
Parts, etc. Lowest prices consistent  
with quality and

# A GUARANTEE

with every part shipped. Complete satis-  
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Just Write  
**Newton's Auto Salvage**  
When you are in the market for  
Anything for the Automobile  
New and Used  
Gears—Axles—Bearings—etc.  
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Speedster Bodies ..... \$ 65.00  
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Write for particulars  
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# THE CHICAGO AUTO PARTS CO.

Motors of standard makes.  
We carry a complete line of PARTS for all  
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We know we can supply your needs, having  
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We'll save you 50 to 75 per cent on all  
PARTS.

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TOP RECOVERINGS  
BACK AND SIDE CURTAINS  
SEAT COVERS

For All Cars

SPECIALS FOR FORDS

Complete Roof and Back, Ready to Put On.

Roadster ..... \$ 8.75

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ONE MAN Touring Top, complete ..... 36.00

Roadster ..... \$6.75 Touring ..... \$11.00

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ATLANTA AUTO TOP AND

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153 Edgewood Ave., ATLANTA, GEORGIA

# Save From 40% to 90%

On new and used Parts for all makes of cars. Write  
for what you need. We'll give full information. Send  
old parts for duplication.

SAM CORAZ AUTO PARTS & TIRE CO.  
519 N. Illinois St. Indianapolis, Ind.

# Save 50 to 75% on Parts FOR MOST ANY MAKE OF CAR

Send trial order also old parts

for duplication

INDIANA AUTO PARTS AND TIRE CO.  
318 N. Illinois St., Indianapolis, Ind.

Parts and Repairs

## Do You Need USED PARTS ?

We can supply you with parts from our large stock at prices that will save you money. We do business on prompt service and a square deal. Your money back if you are not satisfied. All orders shipped same day received. Send us a trial order.

**U. S. MOTOR PARTS COMPANY**  
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Parts and Repairs  
Tires

## QUALITY PARTS

We carry a large stock of used parts. Try us when in need the next time. You'll find your interests are ours. Prices low as quality permits.

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Tires  
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## 50% OFF

Present List an Best Standard  
**SECONDS**

Prices cheerfully quoted on Single Tire Orders or car load lots. Tell us sizes desired.

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Auburn—10	E. M. F.—All	Moline—10. M35
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Brush—	Flanders—20. 2	42
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Cadillac—10	Franklin—10	Rambler—10
Carter Car—13.	Gay Truck—	Regal—To '15
B	Model G 1914	Reo—10S. 11.
Chalmers—36	Hudson—20. 33	12. 13. 14. 15
Model 17	Hup—20	Saxon—Baby 4
Chevrolet—	Imperial—34	Saxon—4 6
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Cole—30	LD11	Stoddard-Day-
Cutting—12	Krit—20-25	ton—H10
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**TIRES AND TUBES**  
Special Attention to Magneto, Generator and Starter Service  
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32x3 1/2	9.00	2.00	35x4 1/2	14.00	2.65
31x4	9.50	2.15	36x4 1/2	15.00	2.75
32x4	10.50	2.15	38x4 1/2	22.00	...
33x4	11.50	2.25	37x5	15.50	2.85
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31x3 1/2	6.25	1.80	35x4 1/2	10.00	2.50
32x3 1/2	6.50	1.80	36x4 1/2	10.50	2.50
34x3 1/2	7.50	1.80	35x5	11.25	2.50
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To sell factory rebuilt tires; exceptionally large profits; selling price of tires less than one-half any other tire; exclusive territory open for live men; dandy opportunity for garage owners and auto tire dealers; write at once for our proposition.

SAMSON TIRE COMPANY  
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We have to offer an attractive proposition to real business men now established in a distribution of automotive products. Correspondence invited with such organizations as have aggressive sales force now calling on garage and repair men. Refer to our advertisement in Display Section this paper.

ATLAS MFG. CO., Pittsburgh, Penna.

**SITUATION WANTED RATES**

30c per line; minimum price, \$1.20

Payment in advance required. Compute six words to line. Forms close Thursday noon each week.

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Branch Managers' Position Wanted—Chicago preferred. By an experienced auto and accessory man, well acquainted and connected in Chicago Dist. and tributary territories. Good organizer, successful manager, real executive, seeking a change for growth and a connection which has unlimited possibilities for an ever increasing future and permanency.

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CROP FAILURE forces the closing of my garage; experienced in tractor and car overhauling; storage batteries, welding and vulcanizing. I want a good permanent position. General Delivery No. 25, Bottineau, N. Dak.

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## Why Not You?

Write us what you have to sell and to whom you want to sell, as we are always glad to tell of our ability to serve you and of our facilities for co-operating with you.

### CLASSIFIED ADVERTISING DEPARTMENT

MOTOR AGE

Mallers Building

Chicago



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### DOES DELIVER THE GOODS

Remember S & P Brand is packed in THE YELLOW CAN. WE Guarantee that it gives the quickest and most practical results with hand or power driven tool.

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Common sense dictates the use of the best auto warning signal you can buy. Good judgment points to the

## BUELL EXPLOSION WHISTLE

because it is the most efficient in action, the simplest in operation and the most durable in service.

The Buell is the original explosion whistle and has been adopted as standard or optional equipment on 70 motor cars and trucks. It is guaranteed for 10 years.

Your dealer carries the Buell—or write us for circulars.

## BUELL MANUFACTURING COMPANY

2977-79 Cottage Grove Ave.,  
CHICAGO



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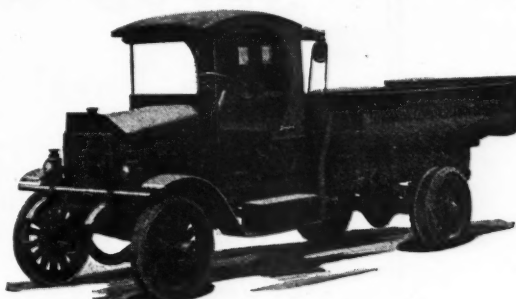
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2½, 3½,  
5 Tons

Worm  
Drive

## Sanford Trucks



One of eight Sanford 3½ ton trucks. Equipped with Wood hydraulic hoist and special metal dump body. In the service of the Towanda Construction Co., Towanda, Pa.

### An Evidence of Satisfaction

Big construction companies find their success with one Sanford can be multiplied by adding more. Experience leads to repeat orders.

Sanford fleets are conclusive evidence that Sanford trucks are worth while when it comes to quality, service and satisfaction.

Order Today

Sanford Motor Truck Co.

Syracuse, N. Y.



HERE'S a  
p u m p  
that puts air

into the tire at the downward as well as the upward stroke of the pump piston and saves waste of air and energy.

**FAPCO**  
FORCE AIR PUMP

Mechanically correct—the two valves hold all the air and force it into the tire—that's what counts when pumping against 60-80 lbs. pressure in the tires.

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The "Fapco" is different from all other tire pumps and it's going big. On request we'll send you full information and quote prices which will mean profitable sales.

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PUMP CO.**

Jefferson, Iowa

## Serve With **VULCAN**

The Replacement Spring

### Service Pays!

The motorists of your community need Vulcan Spring Service—they want it,—they are willing to pay for it. Will you give it to them?

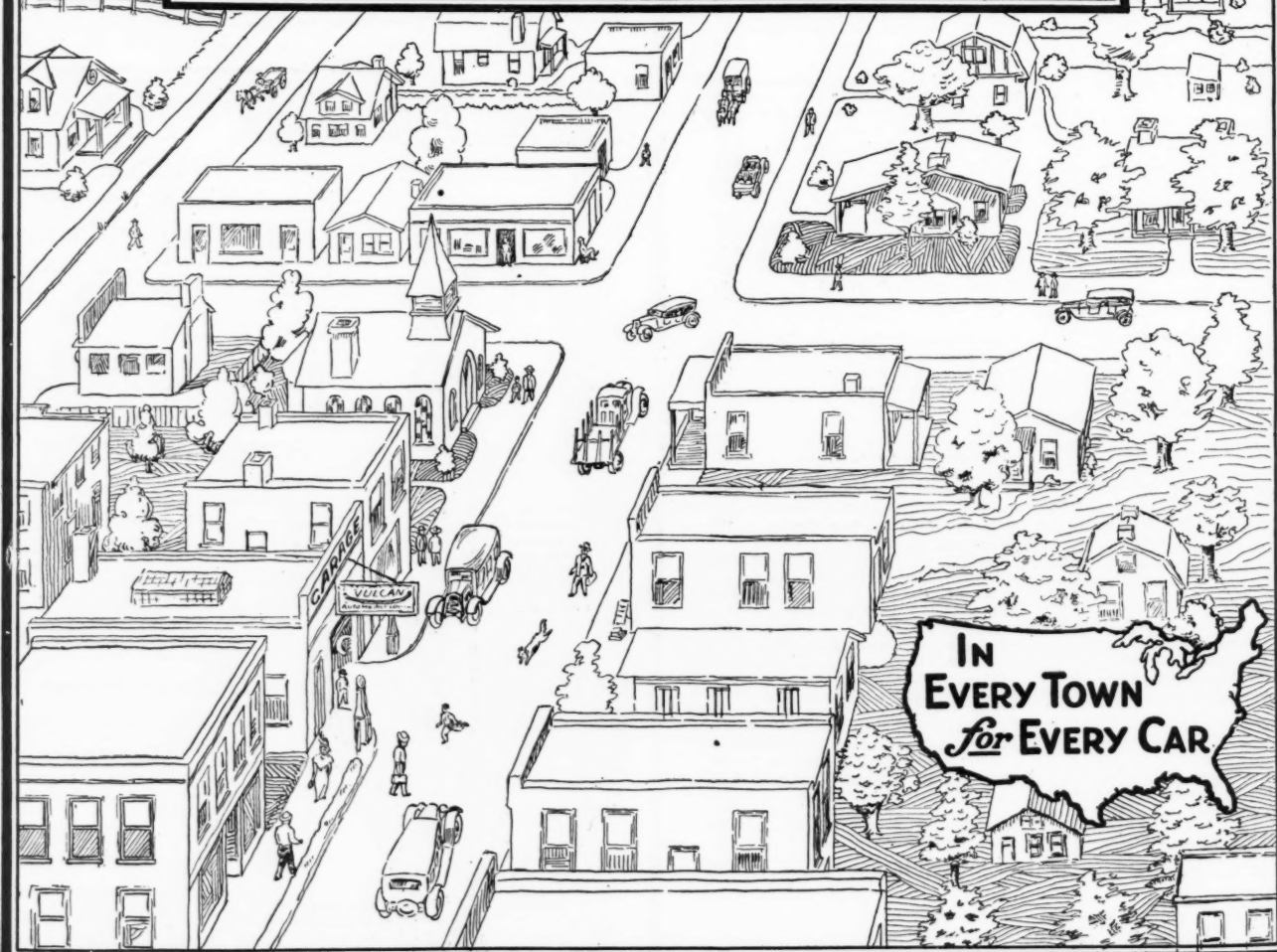
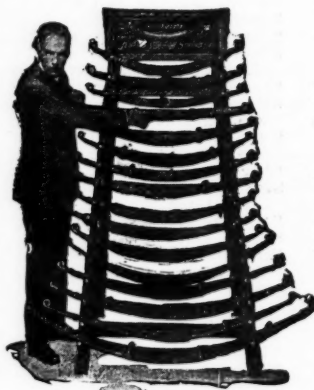
### Service Pays!

Write for our terms to dealers, and particulars of our free display rack offer.

### Jenkins Vulcan Spring Co.

Factory, Richmond, Indiana

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# WIRE WHEELS



We are in a position to make immediate delivery on sets of Wire Wheels for

BUICK  
CADILLAC  
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Set of 5 House Wire Wheels, 4 inner hubs, 4 hub caps, hub cap wrench, spoke nipple wrench, one hub dust cover for spare wheel. White, Black, Red; color optional.

For Fords, \$70.

For Chevrolet 490 and Overland Model 4, \$80.

If there were just one set of Wire Wheels in existence, they would attract more attention than some world-famous examples of engineering.

For Wire Wheel designers had more than the law of gravity to overcome. In addition, there was locomotion, centrifugal force, radial pressure and side thrust.

And how nicely have all these problems been solved! Steel's strongest asset is utilized—its tensile strength. The car weight is *suspended* from the upper half of the rim.

Close examination will reveal the fact that the ingenious spoke construction also makes use of steel's tensile strength to withstand side thrust.

A wonderful feat of engineering—strength and resiliency—and exceptionally good-looking. Our branches carry in stock Wire Wheels for your car.

## WIRE WHEEL CORPORATION OF AMERICA

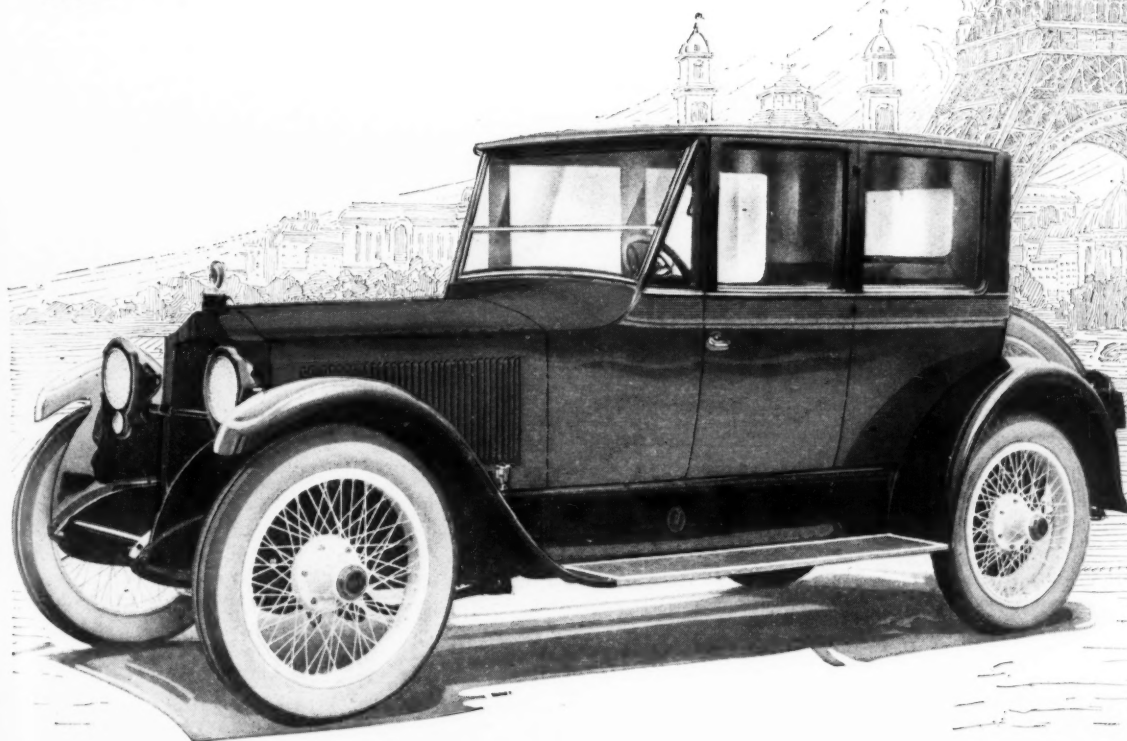
(Successor to Houk Manufacturing Co.)

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# STANWELD

## DETACHABLE RIMS FOR WIRE WHEELS

The Detachable Rim  
with a Positive Lock



### You Can't Throw Ring or Tire

It is this positive locking element that holds rim and tire secure though the tire runs flat, as well as the simplicity and ease of manipulation which causes these rims to be specified on all their wire wheel equipment, by many leading car builders, including

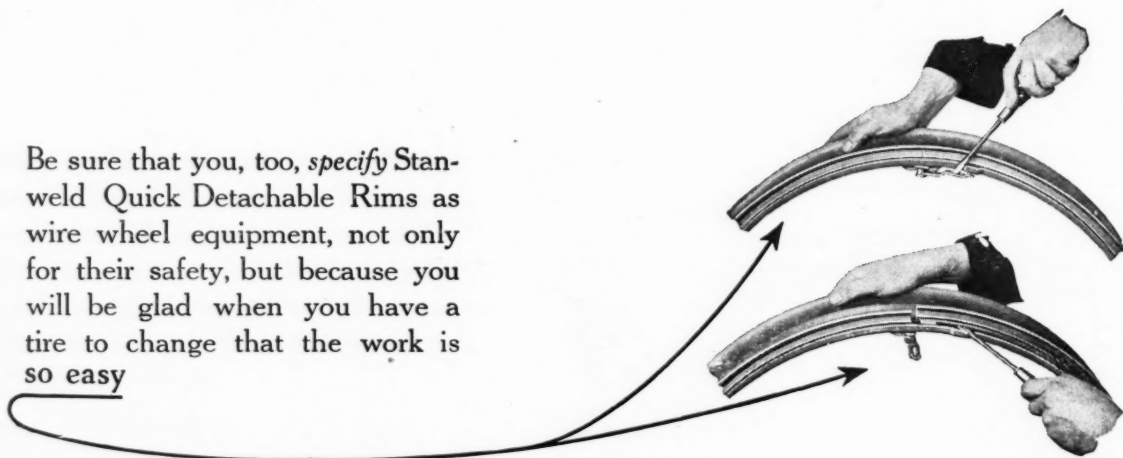
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**Chandler**

**Marmon**  
**Packard**

**Peerless**  
**Pierce Arrow**

**Stutz**  
**Winton**

Be sure that you, too, *specify* Stanweld Quick Detachable Rims as wire wheel equipment, not only for their safety, but because you will be glad when you have a tire to change that the work is so easy



**STANDARD WELDING DIVISION—THE STANDARD PARTS CO.**  
**CLEVELAND, OHIO**

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